

ZOOLOGY OF EGYPT

ANDERSON

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VOLUME FIRST

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REPTILIA

AND

BATRACHIA

1898







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ZOOLOGY OF EGYPT.







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VOLUME FIRST.

## REPTILIA AND BATRACHIA.

BY

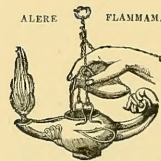
JOHN ANDERSON, M.D., LL.D., F.R.S.

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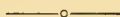
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## P R E F A C E.



THE first step towards the preparation of this volume was the formation of a collection of the Reptiles and Batrachians of Egypt. This was an absolute necessity, as these groups were evidently so poorly represented in the Museums of this country and in those of Europe, that it would have been impossible to have derived from them any just conception of the extent of these constituents of the Egyptian Fauna. Moreover, in Great Britain, as on the Continent, it was a rare circumstance to find a specimen with any more definite locality assigned to it than "Egypt," "Nubia," or the "Sudan."

In forming the Collection which was to serve as the basis of this volume, an endeavour was made to obtain as many specimens as possible from a diversity of accurately ascertained and registered localities, distributed over as wide an area as practicable.

While in Egypt, in 1892, I drew up a Memorandum pointing out the lack of information that existed regarding the Fauna of the country generally, but more especially of the Mammalia, Reptilia, and Batrachia; and further, to make this Circular as useful as possible, it was translated into Arabic through the courteous assistance of Colonel Sir Colin Scott Moncrieff, at that time Director of Irrigation, who also aided me in its circulation. Those who favourably replied to the Memorandum were furnished with the necessary materials for collecting, and with full instructions for the proper preservation of the specimens.

Nearly five years were devoted to collecting, and with the result that over 1500 specimens of Reptilia and Batrachia were brought together, of which more than 1400 were permanently preserved. The greater part was presented to the British Museum; another set, all but complete, was also presented to the Museum of the

Egyptian Government School of Medicine in Cairo; and a few of the more important species were given to some of the Museums in Europe.

In the present volume, I have mentioned the names of the various donors, but I embrace this opportunity again to tender to all of them my best thanks for their aid so generously given; and especially to acknowledge my obligations to Captain R. H. Penton, R.A.M.C., who so energetically carried on in Suakin and in its neighbourhood the work initiated there by Colonel Sir Charles Holled Smith shortly before his retirement from the Governorship of the Red Sea Littoral.

I have also to express my hearty thanks to General A. Hunter, for his hospitality while he was Governor of the Red Sea Littoral, and for the great assistance he gave me during my visit to the Suakin District.

I have much pleasure likewise to record my indebtedness to Dr. H. P. Keatinge, Vice-Principal and Professor in the Medical School of Cairo, for the lively interest he has always evinced in my work, and for his having done as much as lay in his power to promote its success.

The Curator of the Museum in the Medical School, Dr. Walter Innes, very materially aided me in my researches, presenting me with some valuable specimens, besides supplying many native names of the reptiles, which, as he is a proficient in Arabic, I had no hesitation in adopting. But, in order to insure accuracy, as I had no personal knowledge of the language, they were submitted by me to Mr. A. G. Ellis, of the British Museum, who very kindly gave me the benefit of his advice. He is, however, in no way responsible for the names.

But besides the collection of specimens in alcohol, frequent attempts were made to send to London living Lizards and Snakes for the purpose of having life-figures, in each case, prepared for this work. In these efforts no one more heartily and efficiently assisted me than Mr. Alan R. Birdwood, of Cairo, Sub-Director of the Government Lands Department, &c., to whom I desire to acknowledge my indebtedness. Through his instrumentality some interesting species of Reptiles and Mammals reached this country alive, notwithstanding the difficulties attending their transmission.



The collection of Mammalia likewise, so far as it went, was a great success; but this section being more difficult to deal with, and requiring more skill and labour as well as time for the capture and preservation of its members, a great deal in it yet remains to be achieved.

The recent events in the Egyptian Sudan now throw open a vast field for zoological research, and I trust that those who have assisted me in the past may see their way to continue their assistance in the future, and so enable me to make the volume on the Mammalia, now in progress, as complete as possible.

It would have been almost impossible for me to have undertaken this work had I not had the co-operation of the Natural History Department of the British Museum heartily accorded to me by Sir William Flower.

To Mr. G. A. Boulenger, Custodian of the unrivalled Herpetological collections of that Institution, I feel under a debt of gratitude which it is difficult to express, as his assistance met me in so many ways. Not only was his vast experience freely proffered; but the facilities he gave to me, in the way of free access to the specimens under his charge, proved invaluable. But my indebtedness does not stop here, because I have made free use of his published Catalogues; and as one out of many illustrations may be mentioned the fact that the dentition of the various genera of Snakes given in this volume rests entirely on Mr. Boulenger's Catalogue of that Group. Moreover, I have followed his classification of the Reptilia and Batrachia.

I am indebted to Professor G. B. Howes for his having kindly permitted one of his assistants, Mr. Vanstone, to make for me a few preparations of the epidermal covering of the digits of some lizards.

The Plates, illustrating the species described in this volume, have nearly all been drawn by Mr. P. J. Smit, some of them from life. My impression is, that Mr. Smit has very skilfully and successfully delineated the different species, and, in this view, I think that I shall have the support of other herpetologists. Moreover, he was deputed by me to visit the Royal Museum of Natural History, in Stockholm, in order to

examine and figure some Linnean types of snakes preserved in that Institution. In addition to doing so, he made notes on the specimens for my information, and for what he accomplished on that occasion and for his work generally, I beg to assure him of my high appreciation.

The remaining Plates, 10 in number, are the work of Mr. J. Green and Mr. H. Grönvold.

The map accompanying this volume was specially compiled by Mr. Reeves, of the Royal Geographical Society, to indicate the positions of the chief localities mentioned in the text, and was so effectively transferred to stone by Mr. J. Green, that the prints thrown off by Messrs. Mintern Brothers display remarkable clearness.

To Professor Dr. Oscar Boettger, of Frankfort-on-the-Main; to Count M. G. Peracca, of Turin; to Professor F. A. Smitt, of Stockholm; to Dr. Gustav Tornier, of Berlin; to Professor Léon Vaillant and M. F. Mocquard, of Paris; and to Dr. Franz Werner, of Vienna, I beg to convey my thanks for their courtesy on the various occasions on which I had to apply to them for assistance.

The Introduction is illustrated by a series of photographs, which have been very generously placed at my disposal for the purpose by Mrs. Theodore Bent, Mr. A. J. Chalmley, and Professor Flinders Petrie, to all of whom I proffer my best thanks. Those of the Erba and Elba groups of mountains have a special interest, as the regions which they illustrate are but little known. For the four photographs of the Libyan desert, I am indebted to the very valuable Album issued by Remelé, one of the members of the Expedition under the late Dr. Gerhard Rohlfs. All of these photographs have been very successfully reproduced by the Swan Electric Engraving Company.

71 Harrington Gardens, London,  
1st November, 1898.



# LIST OF ILLUSTRATIONS IN INTRODUCTION.

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Map of Egypt and surrounding areas.

- Pl. I. Wádi Gabait, Erba Mountains. From a photograph by Mr. A. J. Cholmley.  
Jebel Erba from Wádi Khur. From a photograph by Mr. A. J. Cholmley.
- Pl. II. Wádi Ambaia, Erba Mountains. From a photograph by Mr. A. J. Cholmley.  
Wádi Kukut, Erba Mountains. From a photograph by Mr. A. J. Cholmley.
- Pl. III. Jebel Shellal, Elba Mountains. From a photograph by Mr. A. J. Cholmley.  
Looking towards the Red Sea from Jebel Shellal, Elba Mountains. From a photograph by Mr. A. J. Cholmley.
- Pl. IV. Source of the Shellal Stream, Elba Mountains. From a photograph by Mrs. Theodore Bent.  
Jebel Shindui from Jebel Shellal, Elba Mountains. From a photograph by Mr. A. J. Cholmley.
- Pl. V. Western slope of desert at Farafreh. Reproduced from a photograph in Remelé's 'Photographic Album of the Libyan Desert.'  
Bab-el-Cailliaud, Oasis of Dakhel. Reproduced from a photograph in Remelé's 'Photographic Album of the Libyan Desert.'
- Pl. VI. Desert landscape near Dakhel. Reproduced from a photograph in Remelé's 'Photographic Album of the Libyan Desert.'  
Oasis of Dakhel, escarpment of plateau in the distance. Reproduced from a photograph in Remelé's 'Photographic Album of the Libyan Desert.'
- Pl. VII. Escarpment of desert plateau at Abu Roash. Alt. about 183 mètres above Nile. From a photograph by Professor W. M. Flinders Petrie, D.C.L.  
Desert plateau behind Gizeh, looking south-west. Alt. about 76 mètres above Nile. From a photograph by Professor W. M. Flinders Petrie, D.C.L.  
Outcrop of limestone desert behind Gizeh, looking eastward across Nile to Mokattam Hills. Alt. about 122 mètres above Nile. From a photograph by Professor W. M. Flinders Petrie, D.C.L.  
View from top of escarpment of desert plateau above Naquada, looking across Nile valley to the eastern desert. Alt. about 365 mètres above Nile. From a photograph by Professor W. M. Flinders Petrie, D.C.L.  
View from top of plateau above Naquada, looking westward down a valley of the désert. Alt. about 426 mètres above Nile. From a photograph by Professor W. M. Flinders Petrie, D.C.L.  
View through cleft from top of plateau above Naquada, looking into Nile valley. Alt. 426 mètres above Nile. From a photograph by Professor W. M. Flinders Petrie, D.C.L.





## CORRIGENDA.

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- P. xxxv, line 29, for *boselaphus* read *buselaphus*.  
P. liv, „ 10, *et passim*, for Lefèbvre read Lefebvre.  
P. lviii, „ 3, for genus read species.  
„ „ 4, omit the words and designated the species *B*.  
P. 2, „ 22, for Deodorus read Diodorus.  
P. 22, „ 11, for طائر التمساح read طائر التمساح.  
P. 33, lines 19 & 28, for Khartoum read Khartum.  
P. 44, fig. 3, for Genoa Museum read British Museum.  
P. 62, line 9, *et passim*, for ragazzi read ragazzii.  
P. 142, line 23, for رول النحر read رول النحر.  
P. 179, Table, for lichtenstenii read lichtensteinii.  
P. 215, lines 31 & 37, for Muscat read Maskat.  
P. 328, line 36, for حمة قرعة read حمة قرعة.  
P. 333, „ 34, for *bikurûn* read *bilkurûn*.  
P. 358, „ 15, for and also read but it does not occur.



## INTRODUCTION.

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THE genius of the French produced, during the first three decades of this century, that magnificent work entitled 'Description de l'Égypte, ou Recueil des observations et des recherches qui ont été faites en Égypte pendant l'expédition de l'armée Française.' This great achievement dealt with the country in nearly all its aspects, each department of research having been intrusted to a savant well qualified to expound it. In those days, however, zoologists were not alive to the importance of recording the exact localities in which the species they described were found; and the French naturalists were no exception in this respect, so far as the Reptiles and Batrachians were concerned, as all the information put on record regarding their distribution is that they came from 'Egypt.'

The present work contains some additional facts bearing on the Reptiles and Batrachians of Egypt and their distribution, and thus supplements, at the close of the century, during the occupation of Egypt by the British, the information brought together by the French at the beginning of the century, when they were, for the time being, masters of the Valley of the Nile.

In drawing up this account of the Reptiles and Batrachians of Egypt it would have been an easy matter to have arbitrarily drawn a line from east to west at the First Cataract, and to have excluded all species found to the south of it, and thus to have confined this description to the area corresponding to the Egypt of the ancients. But Egypt of the past is no longer the Egypt of the end of the nineteenth century, which has now its frontier in the Nile Valley as far south as Wádí Halfa, and its frontier of the Red Sea littoral, at Tokar.

Moreover, as the physical characters of the region on the east bank of the Nile lying to the south of the arbitrary line are practically identical with those existing to the north of it, and as the same is also true of the corresponding areas on the west side of the river, there is every reason why the consideration of the zoological features of these areas should be extended to the political frontier; and had there been any



diversity in their physical conditions, the argument for their conjoint consideration would have been even more cogent.

In a State surrounded by civilized neighbours and with a well-defined political frontier, any account professing to deal with its animals would naturally be restricted to those found within its borders; but as Egypt presents neither of these conditions, and as the animals occurring in the semi-civilized States outside of it are almost unknown, it is desirable in dealing with Egypt to enumerate the few facts that have been ascertained regarding the fauna of the adjacent areas. Had this account been restricted to Egypt as accepted by the ancients—a mere fragment of the great natural highway of animal distribution in North-east Africa—to the exclusion of its adjacent areas, it would have completely failed to impart any just conception of the character of its fauna.

This work therefore comprises, not merely an account of all the Reptiles and Batrachians hitherto recorded from Egypt proper, but also includes those that are known to occur in the desert regions on both sides of the Nile as far south as Wádi Halfa, the present temporary frontier in the Nile Valley; and in order also to convey some idea of the Reptilian and Batrachian fauna of its extreme southern frontier, the species that have been met with in the district of Suakin, on the littoral of the Red Sea, are likewise included. Unfortunately, the Arabian and Nubian deserts, almost throughout the whole of their extent, are as yet a sealed book to zoological science. Schweinfurth has done much towards the elucidation of their flora, but nothing equivalent to his researches in botany has as yet been attempted for their zoology.

Now, however, that the brutal rule of the successor of the Mahdi has opposed to it, in actual conflict, the irresistible resources of Western civilization, fully resolved on its destruction, there is every hope that when the inevitable end has been accomplished<sup>1</sup> it will be followed by topographical, geological, mineralogical, zoological, and botanical surveys not only of the regions to the east and west of the Nile, but of the entire area of a rejuvenated and vastly extended Egypt.

To the north-east, the boundary-line is drawn from Port Said to Suez; but the Wells of Moses in the neighbourhood of the latter town are the eastern limit, and Marsa Matru on the Mediterranean, about 241 kilom. west of Alexandria, is the western boundary. As yet, however, only four species of reptiles have been obtained from Marsa Matru, and fourteen reptilian and two batrachian species from the Libyan oases, excluding the Fayum, while from the centre of the Libyan desert only one reptile, viz. *Cœlopeltis monspessulana*, has as yet been reported. The difficulties that attend travel in the Libyan desert are proverbial and cannot but always render the study of its zoology a most difficult undertaking. The circumstance, moreover, that explorers who have visited that desert and interested

<sup>1</sup> Since the above was in type, the destruction of Mahdism has been achieved by Sir Horatio Herbert Kitchener; and the frontier of Egypt has been re-established as far south as Fashoda and Sobat.

themselves in its zoology have almost invariably selected the winter months for their journeys seems largely to account for the very meagre knowledge we, as yet, possess of its Reptiles.

The few species that have been recorded from the Nile Valley as far south as Khartum, Kordofan, and Sennaar are incidentally noticed, so that a still wider horizon is brought into view.

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#### PHYSICAL FEATURES OF THE AREAS TREATED OF IN THIS WORK.

THE area lying approximately between  $16^{\circ}$  and  $17^{\circ} 40'$  N. lat. is a zone in which an annual struggle for the mastery takes place in May and June between the northerly and southerly winds. The wind from the latter direction follows the sun in its course to the north of the Equator and carries along with it rain-clouds brought up from the Indian Ocean; but as it approaches this zone it encounters opposition from the north wind that blows up the Nile Valley and over its deserts, and is ultimately neutralized by it. The climatic conditions over this debatable zone vary annually, more or less, according to the relative strength of the two winds. The immense area to the south of this zone, as far as the Equator, is characterized by the periodical fall of rain, generally between the months of April and October, and as the Equator is approached the rain becomes more and more torrential. The northern limit of these periodical rains may be placed about the junction of the Atbara with the Nile. However, even so far south as Khartum, where the rain begins rarely before June or July, and lasts to September, the rainfall is frequently very deficient. These periodical rains, where fully developed, exercise a remarkable influence on the character of the flora, and consequently also on the fauna. To the north of  $17^{\circ} 40'$ , on the other hand, as far almost as the head of the Delta of the Nile, there is a complete absence of periodical rains; indeed the entire region is practically rainless, and thus the sparse flora and the fauna differ entirely from those of the southern portion of the region of periodical rains. When rain does fall north of  $17^{\circ} 40'$ , it is only as fitful local storms of short duration after long intervals of absolute drought, which may extend to years. These storms are generally violent and attended by high wind, thunder and lightning, the rain being precipitated in torrents, filling the empty khors and flooding the plains. Whilst the area may be thus generally characterized, the portion of it lying near to the shores of the Red Sea, traversed by high mountains, is more highly favoured, as storms of rain more frequently break along their heights.

The lateral extent of Upper Nubia is clearly defined on the east by the more or less forest-clad slopes of the promontories of the Abyssinian plateau, and on the west by the main stream of the Nile. Its southern half falls within the so-called Eastern

Sudan, and a purely arbitrary limit to its southern extension may be placed in the neighbourhood of the sources of the Tumat, a branch of the Blue Nile, and of those of the Sobat, a leading affluent of the White Nile. The almost rainless region of Lower Nubia has had its northern limit placed at Assuan; but as the crystalline mass of mountains that traverses it from south to north does not stop short there, but is continued along the so-called Arabian desert to Wádí Araba, the entire region between the Nile and the Red Sea from Suakin to near the head of the Gulf of Suez may be dealt with as a whole; there being, as has been already said, no natural barriers to interfere with the distribution of animal species, and the climate throughout being transitional.

A brief outline will now be given of the main features of the entire area from the Bayuda Peninsula to Suakin, and northwards to the Delta. The first portion to be considered is the peninsula enclosed by the great curve of the Nile between Metammeh and Ambukol, occasionally erroneously called on maps the Desert of Bayuda, but which partakes in reality of the character of a savannah. From the position it occupies in the Nile Valley, it is a region in which the struggle between the southerly and northerly winds is felt in its full intensity. In days of great heat also it is subject to numerous whirlwinds, that rise in columns up to 45 mètres, charged with fine dust, the product of the denuding action of the winds on the sandstones. It lies just within the area in which the periodical rains make themselves felt, but they are so slight that rain seldom falls on more than fifteen days throughout the year, the rainy season occurring between May and August. Sometimes, however, two consecutive seasons may be actually rainless. The rain is rapidly absorbed by the sandy soil, and in about 24 hours after its fall all trace of it is lost, except in the vivifying influence which it exercises on the parched vegetation.

The now memorable route between Metammeh and Korti, over which a column of British troops marched in 1884, is described as almost perfectly level. It traverses an extensive plain with low ranges of hills, showing in places abundant signs of cultivation. Numerous wádís are passed through, in which long coarse grass and groups of acacia-trees are met with. The vegetation, sparse though it be, supports numerous herds of sheep, goats, and camels, the property of the nomadic Beduins who inhabit the district. The soil in places, during the rainy season, can be profitably cultivated, and there are numerous wells. To the east of this route the centre of the peninsula is occupied by a group of mountains (Jebel Magaga), consisting of primitive rocks, sandstones, and volcanic lavas and scoræ, similar to those found in the mountain-range along the coast of the Red Sea. The peaks of these mountains are said to rise from 1014 mètres to 1115 mètres above the level of the sea. The half of the peninsula to the north-east of this central area of elevation has much the same characters as those met with along the Metammeh-Korti route. The western portion is



traversed, from Khartum to Ambukol, by a depression known as the Wádí Mokattam, along which probably once flowed an arm of the Nile, and to the west of it is a short ridge of hills consisting of pink sandstone, from which numerous lines of drainage run into the Wádí Mokattam, each generally with a certain amount of vegetation of the usual desert character. On the other side of this ridge, which is known as Jebel Simrieh, there is another long and important valley, the Wádí Malik, along which part of the drainage of northern Dar-Fur percolates to the Nile. This wádí, which is of considerable breadth in some parts of its course, and narrow at others, is dominated in places by castellated rocks, and along its course it is marked by a variety of thorny shrubs and by a fair amount of grass. Between Abu Gus, where the wádí debouches into the Nile, and Sotahl some distance up the valley, the Wells of Mahtúl are situated in a miniature plain surrounded on all sides by sand-hills. Similar wells are found to the east of the Nile on the route to Suakin. At some distance beyond the Wells of Mahtúl the valley narrows and becomes choked with sand, but afterwards it widens and shows signs of the presence of water in quantities, and is thickly wooded with acacias. The route to Khartum traverses the Wádí Sotahl, which has even a more dense vegetation than the Wádí Malik. Leaving this wádí, the route lies through ravines and over rocky plateaus, past other wells, and crosses over a tract having coarse grass but no trees, to enter the Wádí Mdesis, in which are many varieties of acacia. A considerable quantity of water passes down this valley in the rainy season. The route then passes into the Wádí Mokattam, and in the neighbourhood of the Wells of Gabra there is an area thickly wooded with acacias and euphorbias.

It is evident from the foregoing slight sketch of the general features of the Bayuda Peninsula that it does not altogether merit the term desert generally applied to it, seeing that it gives support in places to extensive herds of goats, sheep, and camels. From the presence of so much vegetation it is doubtless tenanted by many species of lizards and snakes, and from its physical configuration it may possibly be the meeting-ground of species from Central, Western, North-western, and South-eastern Africa. Von Barnim and Dr. R. Hartmann<sup>1</sup>, on their journey from Debba to Khartum, met with the following reptiles, viz. :—*Stenodactylus elegans*, *Tarentola annularis*, *Varanus griseus*, *V. ocellatus*, *Cerastes cornutus*, *Echis carinatus*, and *Bitis arietans*, and two species of the genus *Agama*. All of the foregoing identified reptiles, with the exception of *Varanus ocellatus* and *Bitis arietans*, are present in Egypt proper to the south of the Delta. The peninsula is absolutely devoid of permanently-running streams, is only very slightly affected by the sometimes long intermittent periodical rains, is intensely hot, the heat attaining at times to 41° Cent. in the shade, with a diurnal range occasionally of as much as 35° Cent., and has an extremely dry atmosphere.

On the other side of the Nile Valley from the Bayuda Peninsula lies the tract of country intervening between the river and Suakin. This region is traversed by

<sup>1</sup> Reise Nord-Ost-Afr. 1859–60.

caravan-routes of great antiquity, and as it has been frequently crossed by modern explorers and recently by newspaper correspondents, its physical characters are well known, but not so those of the country lying immediately to the north of it. The distance between the towns of Berber and Suakin is about 500 kilom. In the neighbourhood of Berber or El Mekheref, 350 mètres above the sea-level, there is more or less cultivation, but the extent to which it is carried on depends entirely on the rainfall. A few miles beyond the town the route passes the Wells of Mahobeh, where there are a few trees and some scanty vegetation, and proceeding onwards crosses Wádí Selem, which is occasionally an unbroken field of sorghum, but in unfavourable seasons a mere sterile plain with straggling tufts of dry yellow grass. The route traverses a dreary sandy plain covered more or less with loose black rocks, some of them standing erect, one more prominent than the others being a well-recognized landmark about 11 mètres high, and known to the natives as Abu Odfa, but its base is being slowly eaten away by the incessant sand-drift. The plain rises very gradually to the east, and when nearly 96 kilom. from Berber have been accomplished, the famous shifting sand-dunes of O Bâk are reached, enclosing a series of wells, in the neighbourhood of which there is a scanty vegetation, and occasionally, after rain, a crop of sorghum is raised by the wandering Bisharin families frequenting the place. Beyond O Bâk, the route crosses the broad plain of Wádí Laemb that supports a little herbage of coarse grass. The main or northern route continues to ascend, and crossing a number of rocky ridges descends into the valley of Ariab, with its wells of excellent water. This valley is about 8 kilom. long and 3 to 4 kilom. in breadth, and is distant about 180 kilom. from Berber, and lies at an elevation of nearly 548 mètres above the sea. It is covered rather thickly, for a valley of this region, with acacias and coarse grass, which afford a plentiful supply of food for the herds of goats, sheep, and camels owned by the nomads who frequent it. Trees in this valley are rare, but the hollow trunk of one in the neighbourhood of the wells is large enough to give shelter to a man. There are no permanent streams in this valley, neither in any of the other numerous khors and wádís of this mountain-range, but occasional storms break over it and dew falls at night in winter. Beyond this, low granite hills are passed, and then the traveller enters the narrow Wádí Yumga, and again passing rocky hills, traverses a broad level rocky plain surrounded by mountains to enter the Wádí Kokreb. This part of the country does not merit the term desert, as it consists of a succession of deep valleys more or less characterized by the existence of good pasture and a few trees that afford shade, some of the plains even boasting of a fairly rich vegetation. The khors in this neighbourhood teem with animal and vegetable life, gazelles and hares being common. Beyond Wádí Kokreb the road ascends a spur over 700 mètres high above the sea, and enters the Wádí Ohabdl, 8 kilom. in length, closed in by hills, treeless, and strewn with fragments of porphyry and greenstone. The upper end of this wádí opens on a broad barren plain covered with fragments of rock, but its dry

watercourses boast a coarse vegetation, with some acacias and dracænæ. Continuing onwards, the route passes up the Khor Haratri, a winding defile between the granite slopes of the mountains, and with two wells. The head of this khor forms the watershed between the Nile and the Red Sea at an elevation of 880 mètres. A slight descent follows, and then the great plain of the Wádí Ahmed is entered, with the grand mountain known as Taabid at its further end, with bold rocky precipices running down to the broad plain, strewn with fragments of trap and porphyry, excepting in its lower parts, and supporting a few trees and shrubs, and, at rare intervals, small patches of dhurra. After another easy descent over sparse grass and past a variety of trees, followed by a much steeper declivity over rocky ground where the hills close in, the route leads to the tortuous Wádí Omareg, which is nearly level and about 1 to 3 kilom. in width. A ridge is then crossed and the path descends into the valley of Sinkat, at an elevation of 880 mètres above the sea, a favourite resort with the Hadendowahs of Suakin for grazing their flocks at the season when rain occasionally falls, from August and onwards, until the vegetation becomes once more dried up, when they retire to the littoral plain which benefits by the humid atmosphere of the Red Sea. This valley runs nearly north and south, and is closed in on the east by Jebel Erbab and on the west by Jebel Ayakeb. Schweinfurth's description of the vegetation of these valleys will suffice to prove how comparatively fertile they are. He says :—"This rich covering of vegetation is, however, confined to the side of the mountains towards the sea; on the other side, as soon as the second pass is left behind, the rocks are bare, and only the lowest part of the valley is covered with anything of luxuriant verdure. Acacias, growing so closely as almost to form a hedge, and gigantic clumps of the grass-green *Salvadora*, shoot up like great dishes of green salad from the cheerless space around." And again, in describing the valley of Harrasa, in the Erkowit mountain, which attains to 1293 mètres in height, he remarks, this valley "discloses the whole flora of the Abyssinian highland in wonderful and complete luxuriance. Euphorbiæ and dracænæ deck the mountain in masses which might almost be reckoned by millions, so that the slopes in the distance have the appearance of being covered with huge black patches. . . . . Halfway between Singat (Sinkat) and Erkoweet we halted in a wady . . . . which bore the name of Sarroweet. What a prospect! how gay with its variety of hue, green and red and yellow! Nothing could be more pleasant than the shade of the acacia, nothing more striking than the abundance of bloom of the Abyssinian aloe, transforming the dreary sand beds into smiling gardens. Green were the tabbes-grass and the acacias, yellow and red were the aloes, and in such crowded masses, that I was involuntarily reminded of the splendour of the tulip-beds of the Netherlands; but here gardens lay in the midst of a waste of gloomy black stone." The similarity of the life on these heights to that of the Abyssinian highland is not confined to plant-life alone, as that remarkable rodent *Lophiomys* is common to both regions, and associated with it is found *Oreotragus saltator*; but unfortunately very little is known of the



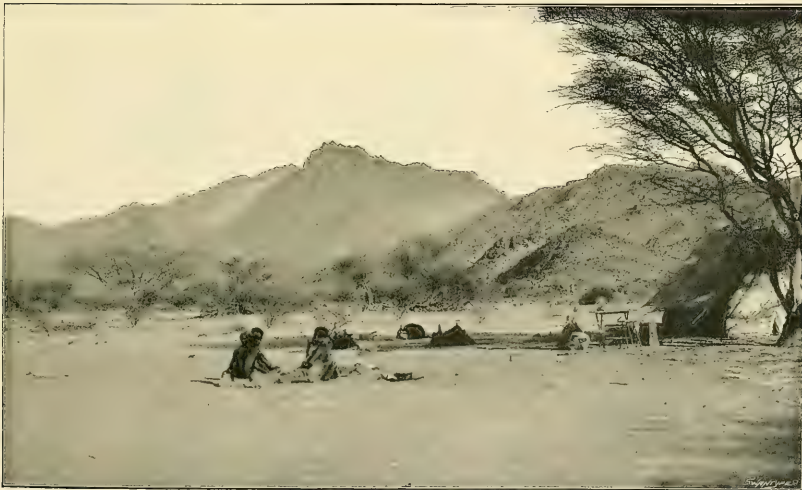
fauna of the Suakin range. From Sinkat a descent is made through a defile in parts closed in by mountains, and sometimes so narrow in its bed that there is only space for the water to precipitate itself when the gorge is in flood. Below, the route debouches on the littoral plain of Suakin at Otao.

The town of Suakin, in lat.  $19^{\circ} 17' N.$ , and long.  $37^{\circ} 20' E.$ , purchased by Egypt from Turkey in 1865, is situated on the seaward face of an extensive plain backed to the west by the Erkowit and Sinkat mountains. In its geographical position it resembles Massowah. The coral-reef is traversed by a long, narrow, deep channel, a feature more or less characteristic of all the coast-line where khors debouch into the sea. According to Dr. Klunzinger, the fresh water which is transmitted along them proves destructive to the coral polypes, so that wherever fresh water flows to the sea it keeps open a clear passage through the reef. The *sahil*, *tehama*, or maritime sandy plain has a gentle upward slope towards the base of the hills for a distance of 13 to 20 kilom. It is more or less undulating throughout, due chiefly to the fact that it is traversed at intervals by broad shallow lines of drainage from the mountains, along and in which vegetation is usually richer than on the intervening portions; but the plain as a whole is here and there covered with acacias and with tabbes-grass, the favourite fodder of the flocks, and by numerous other desert shrubs and plants which have been indicated by Professor Schweinfurth. The country about Suakin itself is tolerably open for miles to the west and north, but to the south-west, in the direction of Tamai, and near the base of the hills, there is a belt of thick undergrowth which extends as far as Tokar. The acacia-scrub occurs in dense patches, in places rising to 2 or 3 mètres in height, with intervening areas of grass and small shrubs. At Tokar, situated on the open plain close to the debouchment of the Baraka, and about 80 kilom. to the south of Suakin, the plain is covered by a thick layer of alluvium brought down the Khor Baraka after the periodical rains have fallen, and on it either dhurra or other crops are grown. The only other delta in any way comparable to this one, along the coast-line to the north, appears to be the small delta at Marsa Durrur. Numerous herds of camels, goats, and sheep are grazed on this maritime plain by their Arab owners. It is occasionally visited by ostriches from the savannah country to the west. Rhinoceroses have been seen on it, and a species of wild ass (!*Equus africanus*) is well known in the neighbourhood of Tokar, where a mountain bears its name. The usual tenants of the *tehama* and its slopes are the following animals:—*Erinaceus aethiopicus*, *Hyæna crocuta*, *H. striata*, *Proteles cristatus*, *Canis variegatus*, *C. famelicus*, *C. pallidus*, *Felis maniculata*, *F. caracal*, *F. serval*, *Mellivora capensis*, *Ictonyx zorilla*, also *Psammomys obesus*, *Gerbillus pyramidum*, *Isomys variegatus*, *Hystrix cristata*, *Gazella isabella*, *G. sømmerringi*, and members of the genera *Genetta*, *Herpestes*, *Lepus*, *Xerus*, and *Acomys*, with a diversity of reptiles to be mentioned hereafter.

The mountain-range running north from Suakin is separated from the spurs of the



Wādī Gabait, Erba Mountains



Jebel Erba from Wādī Khur.





Abyssinian highlands by the valley of the Baraka and by other wádís. Jebel Erbab, about 1547 mètres in height, is the highest peak in the immediate neighbourhood of Suakin, but, a little to the north, Jebel Kerib, behind Durrur, rises to about 1654 mètres above the level of the sea. Still greater heights occur in the Erba group further north, where, according to Mr. Bent<sup>1</sup>, who visited these mountains, in 1896, accompanied by Mrs. Bent and Mr. A. J. Cholmley, one peak, which he calls Nabidua, attains to an elevation of 2286 mètres. From this group of mountains a long ridge of crystalline rocks extends to the west, and is met with at Jebel Shikr on the route from Abu Hamed to Darâvi.

Mr. A. B. Wylde<sup>2</sup> describes the coast-line from Suakin to Rawai as presenting a wonderful sameness. Stretches of flat country or miniature plains divide the different *khors*, in the vicinity of which the land is more irregular, and more vegetation is met with, chiefly acacias, tamarisks, aloes, camel-thorn, and other desert trees. When he visited the *tehama* at Rawai he found it covered with acacias in full flower, and with fresh green grass; larks and other birds were singing, and butterflies and bees were hovering over and settling on flowers. One of the valleys of the Erba group visited by Mr. Wylde was shut in between two high mountain-ridges, and as he followed it up vegetation improved, and the rocks here and there were festooned with ferns. He says the western side of the group, southwards to the Amarara Asorterba, must be covered with plenty of vegetation and pasturage. The rain that falls on this group of mountains and along the range as far south as the commencement of the Suakin mountains is carried off on the western side apparently by two extensive systems of khors. The larger, known as the Wádí Amur, is described as an oasis in some parts of its course, and it appears to reach the Nile at Abu Hamed. The exact course of the second, the Wádí Hayet, is unknown. The relations also of the Erba group of mountains to the plateau of the Nubian desert have yet to be ascertained.

Mr. Bent's excursion, above referred to, was made in the month of February from the small port of Mohamed Ghul. He first directed his steps to the valley system on the north of the Erba group (Introd. Pls. I. & II.), and to reach it his way lay through wádís between low barren mountains and dry river-beds studded here and there with acacia-trees, other watercourses being filled with sand. Ascending and traversing a narrow pass he reached a plateau about 610 mètres above the sea, and, beyond, entered a valley in which there was a small pond of water visited nightly by partridges, pigeons, and sand-grouse, the bottom of the valley being sparsely supplied with vegetation, seemingly only resorted to by gazelles. In a neighbouring valley, Wádí Gabait (Introd. Pl. I.), an old mining district, the senna-plant was growing in such abundance that the leaf-gathering of this drug is one of the industries of the Arabs. Mr. Bent then entered desert valleys in which everything was dried up, the tufts of grass being as black as if

<sup>1</sup> Geogr. Journ., Oct. 1896, p. 335.

<sup>2</sup> '83 and '87 in the Sudan. 1888.

they had been charred and had not had rain for years ; but in one valley to the west of Erba, a favourite nursery for camels, there were masses of *Salvadora* and a variety of other shrubs. Fine deep gaps occur in the mountain, and in the Wádí Khur (Introd. Pl. I.), on its south side, amid stupendous rocky scenery, the floor of the valley was rich with vegetation, consisting largely of tamarisks and other shrubs. Deep pools of lovely water were present in the lateral gorges, in which grew bulbous plants, rushes, and other water-plants. The Wádí Sellal is held in high estimation by the Arabs, by reason of its well and its acacia-trees, but, while Mr. Bent visited it, its charms were hidden by a raging sand-storm. Of the many wádís that penetrate the group the Wádí Ambaia (Introd. Pl. II.) is the most important, as it extends right into the heart of the mountain, and is a pastoral valley, well inhabited, "a delicious spot amid fantastic boulders, with rich vegetation, and a running stream forming deep green pools among the rocks." Similar conditions seem to prevail among the surrounding mountains, and, in the Wádí Kukut (Introd. Pl. II.), Mr. Bent visited a pastoral village, where he found women engaged in making butter in skins tied to a tree.

The next tract of country to be considered is the region intervening between Darâwi, below Assuan, and the town of Berber. A fair conception can be gained of it from Burckhardt's account of his journey between these two points. He followed, in reverse order, the route over which Bruce had travelled 50 years before on his return from Abyssinia.

Starting from Berber, the route, after the plain that skirts the bank of the Nile has been traversed for a short way, lies across Khor Homar, one of the numerous lines of drainage that run to the Nile from the east. This khor may not now merit its name—"Khor of the Wild Ass,"—as the shrieking and puffing of railway engines have in all likelihood scared the animal away, but in Burckhardt's day wild asses and gazelles were found in this part of the desert. These khors generally support a few trees, chiefly acacias ; and the plain, eighty-five years ago, was the breeding-place of ostriches, as Burckhardt, on his tedious journey across it, picked up numerous broken pieces of the egg-shells of these birds. It was also frequented by lizards about a foot in length. Passing more wádís, the route crosses the western end of the great Wádí Amur, already mentioned under the account of the Erba mountains, and then reaches some low isolated hills, among which are situated the wells of Bir-el-Nejem, usually choked with sand. Further on, an immense sandy and pebbly plain is traversed until the wild mountain-range of Shikr is entered, rising about 304 mètres above the plain. This range consists of huge granite blocks heaped on one another in the wildest confusion, and it forms the watershed between the Nile at Abu Hamed and the Wádí Allaki to the north, the elevation of the Nubian plateau being approximately 450 mètres above the sea. Water is found in the Shikr range among the granite blocks, in a winding valley full of dhum-palms, the natural reservoirs being difficult to approach, as they are situated at the end of a narrow passage in a cleft



Wadi Ambaia, Erba Mountains.



Wadi Kukut, Erba Mountains.





among the masses of granite. Here Burckhardt observed some pigeons flying about in the neighbourhood of these *mgbeta*. Leaving these mountains, the route lies over a sandy plateau very subject to mirage, and cut up from east to west by numerous wádís in some of which water collects, and in which vegetation is consequently present in the form of shrubs, with good pasturage here and there. One wádi is distinguished by the number of tamarisks (*Tamaris nilotica*) found in it, and thus, according to Arab fashion, it bears the name of that plant (*tarfa*), and is known as Wádi Tarfaeh. In the same way, some of the wádís, as has been seen, bear the names of mammals, and, it may be added, that others are named after birds. The vegetation of the Wádi Tarfaeh is not confined, however, to the tamarisk, as the senna-plant and dhum-palm are also present, and, this being so, it is one of the most pleasant wádís met with on the route between Berber and Daráwi. Passing over a plain studded with many granite rocks, and crossing other wádís, in some of which dhum-palms afford grateful shade, a mountainous country is passed and more wádís, one of which, the Wádi el Berd, in Burckhardt's time, was overgrown with trees, and here in the month of March he observed flocks of white birds of the size of geese flying northwards. As this valley is more or less open to the Nile, it gets a cool breeze; hence the term "cold" applied to it by the Arabs. In other valleys beyond, with their beds marked by acacias, gazelles are present. The route continues over coarse uneven ground of sand and stones to the broad Wádi el Tanashi, after which a mountain-ridge is crossed to enter the sandy Wádi Ongat, thickly overgrown with acacias and *Cucumis colocynthis*. The route then crosses the main western branch of the Wádi Allaki, about 150 mètres in breadth, with excellent pasturage and many trees, according to Burckhardt. This wádi is held in high veneration by the Arabs, who, in entering it, salute it with great solemnity, and throw a handful of dhurra on the ground as an offering to the good spirit whom they suppose presides over it. Beyond this branch of the Wádi Allaki, another line of drainage, the Wádi el Murra, is traversed, possessing a well forty feet deep, but the water is bitter (*murra*) compared with the sweet water of the Nile. Stony hills are crossed and rocky passages are next met with before the Wádi Nedir is entered, with its numerous acacia-trees, and with its large natural basin, in which rain-water occasionally accumulates. After crossing a sandy plain with isolated granite rocks, ascending and descending a rocky ridge and passing over a wild stony tract of desert, difficult for camels, the wells of Haimar, slightly to the south-west of Korosko, are reached. They are situated on a small sandy plain surrounded by craggy hills. Leaving these wells behind, the route passes through a rocky mountainous country thickly covered with loose stones, across wádís with the usual sparse vegetation of acacia-trees, over sandy or granite-strewn plains and low mountains, one of the latter with luxuriant pasturage and abundant and excellent food for camels at its base, over more extensive sandstone plains, past high mountains and low hills, through more wádís, some of which are shut in by grotesque granite cliffs of smooth shining rocks of

the deepest black, their narrow beds overgrown with acacias, until, after a succession of such scenes, the route ends at Darâwi.

The whole of this region seemingly derives its water direct from the heavens; springs, if present, being excessively rare. As the Arabs almost never divulge the localities where *mggheta* occur, except under great pressure, the syenitic character of some of the mountain-ridges traversing this part of the desert leads to the supposition that these natural reservoirs of water are not so rare as the Arabs would lead the traveller to believe, and, consequently, that animal life in this area is not so hard pressed for water as has been generally supposed. The circumstance also that the wâdîs, in the central portion of the so-called desert, seem nearly in every instance to support a certain amount of vegetation is evidence that the great area throughout its lines of drainage is also characterized by the presence of a fair amount of animal life. The probability is that rodent life in these valleys is well represented, doubtless by no great diversity of species, but by many individuals. A gazelle is not uncommon, but the species has yet to be determined. The wild sheep, *Ovis tragelaphus*, is present in the district of Wâdî Halfa, but it is evidently now being rapidly extirpated by the introduction among the Arabs of modern arms of precision. The ibex (*Capra sinaitica*) is also found in all localities suitable to its habits of life, and likewise a species of *Hyrax*. However, beyond the record of the occurrence of a few species of Reptiles and Batrachians in the neighbourhood of Wâdî Halfa, we are absolutely ignorant of the character of the fauna of this portion of Nubia.

The heat experienced over the foregoing tract of country is perhaps as great as in any other part of Africa, and the cold at night and in early morning proportionately so, the diurnal range of temperature being between 5° Cent. and 47° Cent., or even more. It is very rarely visited by storms of rain, but when they do occur they are generally in the form of hurricanes of great intensity, the denuding power they exercise on the desiccated desert being enormous, and the vivifying influence on vegetation magical.

The tract of the Nubian desert lying between Abu Hamed<sup>1</sup> and Korosko is seemingly more sterile than the great region traversed by Burckhardt. Grant<sup>2</sup>, who had great experience of desert-travel, crossed it with Speke on their return, in 1863, from Central Africa, and described it as one of the most barren and hottest regions he had ever travelled over; but his journey, it must be borne in mind, was made in the month of May. The sandy and in parts pebble-covered desert plain to the north of Abu Hamed, with its feebly-marked khors and scattered hills, is throughout the greater

<sup>1</sup> Linant de Bellefonds, writing about 1828, says of this place :—"Sa situation au sud des cataractes, et la présence des bois qui les avoisinent rendent cependant le pays relativement pittoresque. . . Les bois sont remplis de singes qui, à l'approche des hommes, s'enfuient dans les doums ou palmiers éventails." When Sir S. Baker was at Abu Hamed in 1861, he says the sterile desert extended to the margin of the Nile.

<sup>2</sup> Proc. Roy. Geogr. Soc. 1884, p. 326.

part of its extent, in the month of May, practically destitute of vegetation ; but Grant saw a few birds and two kinds of lizards, and from the circumstance that the ground was full of burrows of small rodents, the probability is that this plain after rain is not the absolute *atmur* that Grant supposed it to be.

After the route has surmounted the escarpments, it traverses the elevated plateau of Nubian sandstone, and crosses a succession of rocky ridges running parallel with others rising from 122 to 304 mètres above the valley, traverses khors, some of them covered with drifted sands, and finally over rocky ground to the wells of Murat in the crystalline mountain known as Jebel Raft, the plateau at this part having an elevation of about 517 mètres above the sea. This mountain, as originally pointed out by Linant de Bellefonds, is the site of ancient gold-workings. It is cut up by many ravines, the drainage from which passes through the valley in which the wells are found, and empties itself into the Wádí Kabkaba, which, in its turn, joins the Wádí Allaki. In all of these ravines water is found after rain, and, in the Wádí Suffur, the last-mentioned traveller, in the month of September, met with beautiful green mimosas in flower. Like other mountains to the east, Jebel Raft has not a few natural reservoirs of water in its ravines. There is also a valley distinguished by the presence of some dhum-palms, distinct from the true dhum-palm of Upper Nubia, and seemingly characteristic of other depressions of the Nubian desert ; and associated with these in the bottom of the valley there are a few acacias. It is thus evident that whenever there are groups of mountains of crystalline rocks in this desert, their ravines and wádís always contain a certain amount of vegetation dependent on the rare rainfall, the water of which percolates down into the beds of the valleys and into the wells, and fills the natural reservoirs, which are evidently as numerous in the crystalline mountains of this part of the desert as they are in those to the east. The mountains, however, being lower, and far removed from the influence of the Red Sea, the rainfall is much less. Major Lyons<sup>1</sup> mentions that from November 1891 to August 1896 only a few showers fell, but that on these two dates the amount of rain was sufficient to fill the wells in the neighbourhood of Murat. Beyond these wells, wádís and rocky ridges are crossed, and that remarkable expanse of desert sand, the Bahr-Hud-Ab, strewn with spheroidal stones of all sizes up to the size of shot, is traversed, after which the sandy Bahr Belāâma, with its isolated conical rocks about 76 mètres in height, and its old well in the bed of the valley, conducts the traveller to a gap in the escarpment of the high plateau of Nubian sandstone, through which a gradual descent is made to Korosko. A few acacias are passed on the way, but vegetation throughout is extremely scant.

Linant de Bellefonds's<sup>2</sup> detailed account of the region intervening between Assuan and the Elba group of mountains is of extreme interest. Some distance beyond

<sup>1</sup> Quart. Journ. Geol. Soc. liii. 1897, p. 360.

<sup>2</sup> L'Erbaye, 1828.

Assuan, he traversed a country studded over with small, rounded, detached mountains of sandstone and granite, the highest of which rises to about 360 mètres above the plain. Here the temperature in the early morning, in the beginning of February, was not more than 5° Centigrade. The route beyond this lay through the valley of Esserba, full of brush-wood and many acacia-trees, all of which were green owing to a recent fall of rain. In this valley there was a Bisharin encampment of eight mat huts. The track continued through rocky ravines with natural reservoirs of water, and everywhere were Bisharin and Ababdeh. The ravine through which his route lay became wide and filled with plants and trees. Here Linant de Bellefonds says:—“Un bouc sauvage, bel animal aux longues soies s'enfuit à notre approche, nous lui donnâmes la chasse inutilement: car il gagna les montagnes avant que nos dromadaires pussent l'atteindre et il se trouva à l'abri de nos balles.” The description of this animal suggests the wild sheep, *Ovis tragelaphus*, rather than an ibex, which the author calls the “*Capricorne*”<sup>1</sup>.

Beyond this was the Wádí Gehetre, cut through rather high mountains of crystalline rocks, where he encamped, as it contained a natural reservoir, which at the time of his visit, 4th February, had been replenished by recent rains. It also yielded plenty of fodder for the camels, and wood to act as fuel to warm the travellers; but the cold at night was so great that the caravan, instead of starting in the morning, had to wait until the benumbed camels had been thawed by the sun. The route continued through a similar country, and passed the old gold-workings of El Seiga, in a valley of that name defined by isolated mountains. Further on, it lay through a frightful undulating desert plain, covered with sandstone and the calcareous detritus of the surrounding hills, granite rocks standing up through the sand. Crossing the mountains it reached the valley Séguel, filled, here and there, with small very green mimosa-trees, and then another valley, where good water was found by digging in the sand. Traversing small hills and winding amid little valleys, with a sparse vegetation, the route arrived at the Wádí Allaki. This great wádí, where Linant de Bellefonds met with it, was a fine wide valley containing plants and shrubs, relatively abundant as far as the mountains which were some distance off. Game, consisting of red partridges, gazelles, and hares, was abundant. As this valley is traced eastwards it becomes narrowed, and at its head is found the site of the ancient gold-mines of Derehib, with the remains of a ruined town and two castles. Linant de Bellefonds visited a number of the wádís that open into Wádí Allaki in the upper part of its course. One of them, confined between small, almost perpendicular, mountains, contained water in its bed, and a variety of trees, some of them very large. At

<sup>1</sup> A herd, according to native report, of 13 sheep (*Ovis tragelaphus*) frequented Semna, 64 kiloms. south of Wádí Halfa, in the summer of 1890. They were supposed to have come from Jebel el Hiss, 96 kiloms. S.W. of the Elba mountains, and to have been driven to the Nile by the drought that prevailed, from 1886-91, in the Aibai district. (Selater, Proc. Zool. Soc. 1895, p. 85.)





Jebel Shellal, Elba Mountains.



Looking towards the Red Sea from Jebel Shellal, Elba Mountains.



the bend of the valley there is the conical mountain formed entirely of great blocks of red granite like that found at Assuan, and attaining to an elevation of nearly 400 mètres above the valley. He ascended it with great difficulty, and found the view of the desert magnificent. The other valleys, such as Daffetti, seemed to have been similar in character. This country was peopled with gazelles and ostriches<sup>1</sup>. Having cleared the defiles of Wádí Daffetti, Linant de Bellefonds visited the mountain and valley of Beint el Fegue, the latter filled with clumps of reeds, and at intervals with little stunted trees, dry and black, the abundant dew that fell not being sufficient to counteract the effects of the burning sun. Hereabouts many wild asses occurred, extremely shy, and scenting man from a great distance. They were trapped by the Bisharin Arabs, who used their flesh as food.

As Mount Elba, 1243 mètres high, was approached the aspect of the country completely changed: the soil became covered with very green mimosa-trees and luxuriant plants, and birds sang in nests of verdure—a grateful sound to Linant de Bellefonds, as since his departure from Assuan, where birds are nearly mute, he had only heard the croaking of ravens. He camped under a superb mimosa, where the borders of the ravine were covered with herbage, and many climbing plants hung down from the trees. He found Jebel Elba to be composed of granite and porphyry, and to be cut up into profound ravines overhung by perpendicular rocks of great height.

The height of the five principal peaks varies from 1220 mètres to close on 1600 mètres above the level of the sea; but, a short way to the south, Jebel Soturba rises to 2100 mètres in height.

At the base of Mount Elba Linant de Bellefonds met with a valley so full of shrubs that he had to dismount from his camel.

The mist on the mountains and on the surrounding country is sometimes very dense and does not clear off until noon.

Like the generality of the mountains along the coast, Jebel Elba and the neighbouring mountains are separated from the sea by a maritime plain (Introd. Pl. III.), the grazing-ground of the flocks of the Arabs. This plain at Elba, as at Tokar to the south, and indeed throughout its extent, wherever it is of any breadth, is occasionally enshrouded in clouds of fine sand and dust raised by the strong south-east wind, so much so that it is difficult for man and beast to breathe.

On the level country around the mountains the Bisharin find gazelles, wild asses, and ostriches, in the valleys hares, and ibex on the mountains—the animals of prey being *Hyæna striata*, the “common wolf” (? *Canis anthus*), the jackal (*C. variegatus*), the small fox (*C. fanelicus*), the “large wolf” called by the Bisharin *Oselo*, the name by which it is known to the Gallas.

Linant de Bellefonds returned to Darâwi by a north-westerly route, along which the

<sup>1</sup> Floyer (‘Étude sur le Nord-Etbai,’ 1893) mentions that one of the wádís of this region is called “Na’am”—that is, the Wádí of Ostriches.

country traversed had much the same character as the region between Assuan and Allaki.

Schweinfurth<sup>1</sup>, in his enterprising voyage made thirty-four years ago along the coast of the Red Sea from Kosseir to Suakin and back in a native boat, visited the Elba group of mountains in the month of April and again in July. On the latter occasion he attempted to reach the summit of Jebel Soturba, but was turned back by the Bisharin. The way to the mountains from the sea lay over undulating ground, alternately between sandy watercourses full of shrubs and ridges of basalt, porphyry, and granite. In places he had to tear his way through thorny bushes and sharp-edged boulders. Further on, when he had reached a low chain of hills (about 30 mètres high), the sandy plain began to rise considerably, and after marching for an hour and a half he encamped on soft sand and grass. Here heavy dew fell at night. Beyond, he crossed a sandy plain bordered by hills and rich vegetation, but the plants were now half dried up, and, at the beginning of Castle Hill, heights of red granite about 76 mètres in altitude were covered to their summits with dried shrubs, and a valley further on was rich in "SSämmors trees." This is only one of a group of mountains each of which is more or less separated from those around it. The double-peaked Jebel Soturba is the mountain that gives its name to the group among the Bisharin. The neighbouring Jebel Alafa is cut into by three great defiles, in which water collects in a number of natural basins among the granite rocks. Schweinfurth, who ascended one of the lesser peaks, states that the flora of this mountain group has exactly the same characters as the flora of Abyssinia, and that the plants on the summit of the peak he climbed were quite distinct from those below. From the highest peak he saw the plain beneath studded with hundreds of thousands of little spots, all acacia-trees. The flora was wonderfully rich considering the rarity of rain.

The late Mr. Theodore Bent<sup>2</sup> also visited the Elba mountains (Introd. Pls. III. & IV.) from the sea, and he describes Jebel Shellal (close on 1220 mètres in height) as the most fertile of the group; and in the month of February, immediately after a copious rainfall, he found its slopes beautifully covered with verdure, and a stream issuing from a deep ravine (Introd. Pl. IV.) that ran right into the heart of the mountain, promising an ample supply to the nomads for some months. He concluded, however, that the country around Elba, except after heavy rain, is little better than a desert.

To the north of the First Cataract the granitic area on the east bank of the Nile becomes narrowed, but the mountainous character is retained throughout the area to which the term Arabian desert is restricted. This entire region, which rises in a gentle slope from the river to the main range, is cut up on the west of the crystalline

<sup>1</sup> Zeitschr. Ges. Erdk., Berlin, 1865, p. 131 *et seq.*

<sup>2</sup> Geogr. Journal, Oct. 1896.





Source of the Shellal Stream, Elba Mountains.



Jebel Shindui from Jebel Shellal Elba Mountains.



mountains by ravines, deep valleys, and khors, having generally a direction from east to west, enclosing lofty plateaus and terraces ranging from 100 to 700 mètres in height, and debouching into the Nile. On the east of the axial range other ravines, valleys, and khors trend down to the *tehamas* and discharge their intermittent floods into the Red Sea, but, in places, the mountain-ridge runs down close to the shore in bold escarpments.

A prominent feature of the Arabian desert is the great depression that crosses it between Kenneh and Kosseir, a highway between the Red Sea and the Nile notable from time immemorial, which has been frequently described. Klunzinger has recorded the following reptiles from in and around Kosseir, viz.:—*Gymnodactylus scaber*, *Ptyodactylus hasselquistii*, *Hemidactylus flaviviridis*, *H. turcicus*, *Agama sinaita*, *Uromastix aegyptius*, *Acanthodactylus boskianus*, *Eremias guttulata*, *E. rubropunctata*, *Chalcides ocellatus*, *Zamenis florulentus*, *Z. ravergeri*, and *Lytorhynchus diadema*.

The broad Wádi Arabah, dominated by lofty cliffs, opens into the Gulf of Suez near Ras Zafarana, and is memorable as the site of Prof. Schweinfurth's discovery of palæozoic rocks<sup>1</sup>. All of the ravines, wádís, and khors on the western slopes of the crystalline ridge of mountains in the Arabian desert north of Ras Benas at Berenice preserve much the same general characters as those delineated by Linant de Bellefonds as distinctive of the lines of drainage of the Elba group; but this great area has yet to be systematically explored, as it has only been touched at points by a few travellers. Schweinfurth<sup>2</sup> has described his visit to the imposing five-peaked Jebel Farageh, about 1315 mètres in height, the Pentadactyle of the ancients, and at the base of which is a plain covered with an encrustation of salt derived from the sea in storms. The bare summits of this mountain present a remarkable contrast to those of the Elba group, which are clothed to their summits with grass and shrubs. The entire mountain is more or less covered with gigantic blocks of granite, often as large as houses, or with great sheets of granite as smooth as tables, while square jagged masses form dark grottoes that serve as hiding-places for gazelles. There are also deep defiles. Schweinfurth, who attempted, in the month of April, to ascend the highest peak, had to abandon his intention about halfway up, owing to the physical obstacles to be surmounted and to the intense heat. He was, however, rewarded by many interesting plants. This mountain is the southern limit of the distribution of *Acacia tortilis*. The Tropic of Cancer, with the desert which it crosses, not only separates Farageh geographically from Elba, but also forms the boundary between a large number of plants. The zoology of this area is quite unknown, but when it has been investigated it will be interesting to ascertain whether any of the animal species have corresponding limits set to their distribution; however, what is known of the forms found along the valley of the Nile does not favour such a supposition.

<sup>1</sup> Bull. Instit. Egyptien, no. 6 (1885).

<sup>2</sup> Zeitsch. Ges. Erdk. 1865, p. 308.

The Wádí Kenneh to the north, which conducts nearly all the western drainage of the ridge between Jebel Gharib and Jebel Kittar to the Nile, leads into a very interesting mountain-region, which may be taken as fairly representative of the Arabian desert. This wádí comes down in a southerly direction, thickly studded in places with acacias, and with other desert plants and shrubs, under which the burrows of many rodents occur. Insects are frequent, and also small birds <sup>1</sup>.

As the Wádí Kenneh enters the hills plants become more numerous, and further up it is joined by one of its affluents, the Wádí Kittar, which comes down from a mountain of the same name. In some parts of its course the latter wádí is rich in mimosa-trees from 6 to 9 mètres in height. One of its upper reaches is choked, in places, with great granite blocks, while higher up its bed is filled with gravel and scattered boulders; and here, by scraping aside the gravel, water may be obtained in sufficient quantity to satisfy a few camels and men. Wilkinson <sup>2</sup>, who was the first to describe this wádí, mentioned the existence at the head of one of its ravines of a precipitous rock overgrown with hanging water-weeds, down which water dripped slowly. Below were palm-trees and rushes, and a basin which afforded a plentiful supply of excellent water on digging a hole in the gravel with which it was filled. Doubtless many other such natural reservoirs of rain-water are present in this desert, and are well known to the nomadic Arabs, who, however, never reveal their presence unless driven to do so, as they are entirely dependent on them for their supplies of water.

In the Wádí Medisa, not far from the Wádí Kittar, there are other large basins of water, and to the north, in a small lateral valley near the Wádí Tarfaeh, and at an elevation of about 800 mètres, there is a large very characteristic natural reservoir of which Schweinfurth has given an account and a drawing in his interesting communication on this part of the Arabian desert, entitled "La Terra Incognita dell'Egitto propriamente detta" <sup>3</sup>.

Animal life is always to be found in the neighbourhood of these reservoirs; and Wilkinson, who knew this desert well, says that, so far from its being destitute of any trace of life, he had the pleasure of seeing gazelles and ibex browsing under *Acacia Seyal*. Mr. E. A. Floyer <sup>4</sup>, when in the vicinity of the reservoir in Wádí Kittar, found *Hyrax syriacus* and *Capra sinaitica* to be common; and mentions that he saw three donkeys, one of them being young, leaping from rock to rock with the agility of goats. He considered them to be domestic animals; but James Burton <sup>5</sup>, in the beginning of the second decade of this century, had observed the wild ass at Ayd, near Jebel Kenneh, not far to the south of the spot where Mr. Floyer saw his supposed domestic animals, and had called attention to the fact that the Arabs of this part of

<sup>1</sup> Proc. Roy. Geogr. Soc. ix. 1887, p. 670.

<sup>2</sup> Journ. R. Geogr. Soc. ii. 1832, p. 49.

<sup>3</sup> Giornale l'Esploratore, anno ii. fasc. 4<sup>a</sup>, 5<sup>a</sup>, e 6<sup>a</sup>; and as a separate publication, Milano, 1878.

<sup>4</sup> Proc. Roy. Geogr. Soc. ix. 1887, p. 671.

<sup>5</sup> Add. MS. Brit. Mus. 25,666.



the Arabian desert let their female donkeys loose to be served by wild males. Gazelles wander over the mountains as well as over the plains, and on the latter and in the wádís hares and other rodents are not uncommon. *Ovis tragelaphus* is associated with the foregoing animals, as Professor Schweinfurth in 1878<sup>1</sup> pointed out that it was found in the neighbouring Wádí Shietun, which opens on the Nile, below Akhmin. Dr. Sclater<sup>2</sup> has quite recently recorded its presence in the Wádí Medisa, on the authority of Mr. E. N. Buxton<sup>3</sup>. *Hyrax syriacus* occurs in one of the upper reaches of the Wádí Shietun in such great numbers that Professor Schweinfurth has named it the "Valle di Hyrax." Natural reservoirs of water are also present in the upper part of this valley.

Wilkinson<sup>4</sup>, who long ago described the general characters of the mountain masses of Jebel Kittar and Jebel Dukhan, ascended Jebel Gharib, a very bold and striking mountain to the north, overlooking the Gulf of Suez. It attains to an altitude of 1646 mètres above the level of the sea, and near its summit he stalked gazelles that had doubtless wandered up the mountain in search of the stray plants which he observed growing every here and there under the shade of projecting stones in the ravines. The following reptiles have been obtained from the plain below Jebel Gharib, viz.:—*Stenodactylus elegans*, *Hemidactylus turcicus*, *Eremias rubropunctata*, *Psammophis schokari*, *Cerastes vipera*, and *C. cornutus*.

The rarity of rain over the great mass of the Arabian desert, more especially to the west of the crystalline range of mountains, may be held as entitling that portion of it to be designated a desert, but at the same time it should be borne in mind that it is a region devoid of rain-gauges. When rain does visit it, it generally falls as a steady downpour, particularly severe in the mountainous portion; but in the wádís to the west the floods of water from off the plateaus and terraces rush into them from every side, leaping in waterfalls over their steep banks, scouring out their beds, rushing as cataracts along the rocky channels with irresistible force, carrying before them the uprooted shrubs or burying those that withstand them under heaps of rubble and sand, a mighty disintegrating power with a capacity for work that can only be justly estimated when it is witnessed in action, or by its effects when viewed immediately after action has ceased. As the wádís are the lines along which animal life is distributed, these floods prove destructive more especially to rodent and to reptilian life.

These storms sometimes assume the character of violent hail-storms: one such was experienced by Professor Schweinfurth<sup>5</sup> on the 12th April, 1864, just outside the tropics, at Wádí Lekhuma, on the coast of the Red Sea, to the north of Berenice, the hail-stones being as large as cherries or pigeons' eggs; and Professor Schweinfurth states that Dr. Dümichen, who was staying that day at Thebes, experienced there

<sup>1</sup> Terra Incog. &c.

<sup>2</sup> Proc. Zool. Soc. 1895, p. 84.

<sup>3</sup> See also Buxton, 'Short Stalks,' 1898, p. 106.

<sup>4</sup> Journ. Roy. Geogr. Soc. ii. 1832, pp. 28-60.

<sup>5</sup> Zeitsch. Ges. Erdk., Berlin, 1865.

three days of almost incessant rain. In winter, the showers also occasionally fall as snow on the higher mountains, such as Jebel Kittar, covering them with a mantle of white and their sides with a network of streams<sup>1</sup>.

The variations of temperature to which the Arabian desert is subject are very considerable, being as much as 30° to 35° Centigrade in the 24 hours, whilst, on the heights, frost is not unfrequent during winter. The cold of the winter months exercises a powerful influence on animal life, rendering many species, more especially reptiles, almost semidormant while it lasts. It is only when the sun fully exercises its sway in the months of summer that reptiles may be said to become possessed of their full vital activity. This is also true, but to a more limited extent, of the smaller mammals. Some of the latter which I have kept in confinement, although they were given every protection in the way of a covering during night, were found in the early morning so utterly benumbed with cold as to give rise to the impression that they were in a fatal collapse, but when the sun rose, and they were exposed to its heating influence, their powers of life returned to them. I have observed this both in the Insectivora and Rodentia, and, as already stated, even camels, in the early morning, are occasionally so torpid from the benumbing action of the cold, that the hour of departure of a march has to be postponed until they become revived by the sun.

The region on the left bank of the Nile known as the Libyan desert has now briefly to be considered, so as to bring out the conditions under which animal life subsists upon its surface. Its physical features differ considerably from those of the Eastern desert, as it is not traversed by a mountain-ridge, and is consequently devoid of any of the great altitudes met with to the east of the Nile. It is also not cut up into deep transverse valleys and ravines, but forms a great tableland with a gradual, but in places irregular, slope from south to north, and attaining on an average to an altitude of from 250 to 300 mètres, although rising in parts to 500 mètres above the sea. Depressions of varying size and depth are met with over its surface, some of them not more than a few miles in length and breadth, while others are hundreds of square kilomètres in extent. They are all more or less enclosed by bold escarpments resembling those which define the plateau where it skirts the Nile, and in some of them the descent to the oasis is made through labyrinths of fantastic rocks. The floors of these depressions, the sites of the famed oases, lie at various heights, but there is no regularly graduated slope from south to north, as the floor of the oasis at Farafreh (76 mètres above the sea) lies at a lower level than that of Dakhel (100 mètres), whereas that of Baharieh (114 mètres) is somewhat more elevated than that of Dakhel, that is, there is a distinct fall from Dakhel to Farafreh, and a marked rise from the latter to Baharieh, beyond which the land sinks, in the Aradj and Siwah district, to 70 mètres and 30 mètres below the level of the Mediterranean. The famous Birket-el-

<sup>1</sup> Floyer, *Proc. Roy. Geogr. Soc.* 1887, p. 678.

Qurun, Wádí Raîân, and Wádí Natrun are further examples of depressions. The first, which occupies the deepest part of the Fayum, had its surface-waters, in 1892, 43·30 mètres below the level of the sea, but the bed of the lake lies from 5 to 17 mètres lower. The second is a bare desert, 40 mètres below sea-level, whilst the third is slightly under the level of the Nile at Teraneh. The springs which give rise to the fertility of the more southerly oases derive their supplies of water, according to Zittel, from a water-bearing bed fed by the water that finds its way down to it from Dar-Fur, a region which has a heavy rainfall. Numerous wells, some of them of great depth, once existed, more or less, throughout all the oases, but many have been choked up with sand. The Libyan plateau is studded over, in places, with flat-topped or conical hills, 60 to 80 mètres high, the remains of a tableland which formerly had its general surface at the level of their summits, and now and again a low isolated mountain rises from it. This tableland of limestone is covered with sand that either accumulates in the form of drifts in the hollows, or covers large areas with shifting sand-dunes 3 to 5 mètres in height, directed from south-east to north-west by the polar winds. This sand, which is so characteristic a feature of this desert and more especially of the great area to the west of the oases, and designated by the members of the Rohlfs Expedition "Das grosse libysche Sandmeer," is derived from the denudation of the Nubian sandstones, chiefly brought about by the action of the wind aided by the extremes of heat and cold, and by rare falls of rain. The sand-charged wind has played a powerful rôle in modifying the Libyan desert, but the nature and extent of its action are questions to be decided by physical geographers. However, from a biological standpoint there can be no doubt that it materially influences the distribution of plants, and thus also affects animal life. The vast plains swept by the winds are practically devoid of plants and animals, and this is markedly the case on the plateau of Nubian sandstone, and amid the huge sand-billows 100 to 150 mètres in height, and the intervening wavelets of the great sand-sea which defied the passage of the Rohlfs Expedition.

The surface of the desert at midday is, as a rule, much hotter than the air which becomes heated by the amount of caloric reflected from off the soil, be it sand, stones, or rocks. The most uniform temperature is met with in such localities as the "Sandheim," to the north-west of Dakhel, in the uninterrupted surface of the great sand-sea. If a thermometer be sunk into the sand for a depth of from 1 to 2 centimètres the temperature of the surface can be ascertained and compared with that of the air; and from the observations made by Jordan in the Dakhel oasis, in the Regenfeld, and in the "Sandheim" it appears that the temperature of the surface sand is, on an average, from 1°·3 to 1°·8 Cent. higher than that of the atmosphere. In the latter locality, on the 12th February, the temperature of the air at 8 o'clock A.M. rose above that of the sand, but by noon the latter had become heated 2°·4 Cent. in excess of the air. On the stony desert the variations of temperature during the day are

sometimes enormous. In the early morning it may be  $-4^{\circ}$  Cent., and in the afternoon as much as  $37^{\circ}$  Cent. Associated with these extremes there is an ever-recurring expansion and contraction of the materials composing the surface of the desert, which in time leads to the complete shattering of pebbles, stones, and rocks. The character of the climate is brought out in the following brief summaries of the itineraries of Cailliaud and other travellers<sup>1</sup>.

Although much can be learned regarding the physical features of the Libyan desert from the writings of Browne<sup>2</sup> and those of succeeding travellers, the names of Cailliaud, Rohlfs, Zittel, and Jordan stand out prominently as the most eminent authorities on that remarkable and deeply interesting area of North-eastern Africa.

The first<sup>3</sup> of these distinguished travellers, favoured by the goodwill of Mohammed Ali, visited, in 1819-20, five of the oases of the Libyan desert, besides the oasis of Siwah, where Boutin had lost his life a few years previously. Rohlfs's Expedition<sup>4</sup>, of which Zittel<sup>5</sup>, Jordan<sup>6</sup>, Acherson<sup>7</sup>, and Remelé<sup>8</sup> were members, proceeded to explore the Libyan desert under the auspices of the Khedive Ismail Pasha, leaving Assiut in the latter half of December 1873, and returning to the Nile valley in the end of March of the following year.

Browne, on his visit to the oasis of Siwah<sup>9</sup>, Feb. 1792, followed the coast from Alexandria, only losing sight of the Mediterranean when he struck southwards to reach his destination. The route was generally smooth and sandy, but many spots were marked with verdure that relieved the general aspect of barrenness. In the places where he encamped he usually met with a species of jerboa<sup>10</sup>, a land-tortoise (*Testudo leithii*), some lizards and serpents, but not in great numbers. Snails, however, were very abundant, attached to the thorny shrubs on which the camels fed. A few hares<sup>11</sup> were observed in the neighbourhood of the springs, and the tracks of antelopes (gazelles)

<sup>1</sup> Phys. Geogr. u. Meteorologie der libysche Wüste. Rohlfs'schen Exped. 1873-74. 1876, pp. 127-128.

<sup>2</sup> Browne (W. G.), Travels in Africa, Egypt, and Syria, 1792-98.

<sup>3</sup> Cailliaud (M. F.), Voyage à Méroé et au Fleuve Blanc, 1819-22. 4 vols. 1826.

<sup>4</sup> Rohlfs (Gerard), Drei Monate in der libyschen Wüste. 1875.

<sup>5</sup> Zittel (Karl A.), Beiträge zur Geologie u. Palaeontologie der libyschen Wüste, &c. 1883.

<sup>6</sup> Jordan (W.), *op. cit.*

<sup>7</sup> Acherson (P.), Botanische Zeitung von Dr. Von Barry u. Kraus, 1874, nos. 38-40.

<sup>8</sup> Remelé, Photographische Album Rohlfs'schen Exped. 1876.

<sup>9</sup> Since W. G. Browne's day, Siwah has been visited by many Europeans, *e. g.* Fr. Hornemann, 1798; Boutin, 18—?; Belzoni, 1819; Cailliaud, 1819-20; Drovetti, 1820; Minutoli, 1820-21, accompanied by Hemprich and Ehrenberg as naturalists, Scholz as orientalist, Gruce as astronomer; J. R. Pacho, 1826; Bayle St. John, 1849; Hamilton, 1856; Rohlfs in 1869, and again in 1874 accompanied by Zittel, Jordan, &c.; Robecchi-Bricchetti, 1886; Weld Blundell, 1894; W. Jennings-Bramly, 1896; Silva White, 1898.

<sup>10</sup> Ehrenberg, on his journey from Siwah to Alexandria, discovered the form known as *Scirtomys tetradactylus* (Licht.).

<sup>11</sup> Ehrenberg recognized the coast hare that he met with on the above route to be *Lepus aegyptius*. The hedgehog, which also occurs, he regarded as distinct from *Erinaceus auritus*.



(? *Gazella leptoceros*, F. Cuv.) and even those of ostriches were frequently seen. The correctness of this observation regarding the presence of the ostrich in the northern portion of the Libyan desert in the end of last century is verified by Geoffroy St.-Hilaire<sup>1</sup>, who says, "elle est commune dans les montagnes situées au sud-ouest d'Alexandrie"<sup>2</sup>. At the same period *Ovis tragelaphus* existed on the hills to the east of Cairo.

Marsa Matru, which lies on the coast to the west of where Browne turned southwards to the oasis of Siwah, has as yet yielded only four species of Reptiles, viz. *Tarentola mauritanica*, *Eumeces schneideri*, *Chamaeleon vulgaris*, and *Zamenis rogersi*; but, when properly investigated, the fauna of the coast-line from Alexandria to Marsa Matru will be found to be, in all likelihood, as far as Reptiles are concerned, a repetition of the littoral fauna of the Delta.

After a series of marches along the coast, extending to 75 hours, during which Browne remarks that hardly a day passed without his being incommoded by showers and by cold winds from the north-east or north-west, he came to a copious well, where he watered his camels and proceeded south-west towards Siwah, and, in about three days, reached the oasis of Garah with its fresh water and date-palms, which, a few years later, was visited by Hornemann. The country beyond was a perfect desert, consisting of "mountains of sand and barren rock," succeeded by an extensive sandy plain followed by other low hills and rocks. Between the oasis of Garah and Siwah the soil was completely encrusted with salt<sup>3</sup>.

The oasis of Siwah, which has frequently been described, and quite recently by Robecchi-Bricchetti<sup>4</sup>, lies in a depression 25 to 30 mètres below the level of the Mediterranean, surrounded more or less by fantastically shaped cliffs, whilst a number of isolated rocky masses stand up from its centre. The dwellings of the inhabitants are built on these eminences, and are so constructed that they assume the appearance of feudal fortresses. These heights once formed part of the surrounding plateau, to the level of which their summits nearly reach. Numerous lakelets and many running fresh-water, mostly thermal, streams are seen on the floor of the oasis, some containing fish, possibly among them the two species, *Cyprinodon dispar* and *C. calcaritanus*; other waters are generally brackish, while some springs contain sulphur. Besides groves of date-palms—apricots, figs, olives, peaches, plums, pomegranates, vines, &c. are cultivated, also some cereals. Although Browne complained of the cold of the journey along the coast, he suffered much from the heat of the oasis. As it lies, however, within the influence of the climatic conditions of the Mediterranean, rain is not uncommon in the months of January and February.

<sup>1</sup> Mém. sur l'Égypte, i. (1799–1800), p. 79.

<sup>2</sup> Also once present in Tunisia: Johnston, P.Z.S. 1898, p. 353.

<sup>3</sup> The salt of Siwah was formerly reserved for certain religious ceremonies and was exported to Persia to be used by the Royal household.

<sup>4</sup> All' Oasi di Giove Ammono, 1890.

Cailliaud, in his account of his journey from the Fayum to the oasis of Siwah in November and December 1819, describes how in that direction he crossed immense plains where the horizon was lost in sand and without a vestige of vegetation, and how he passed among dunes of moving sand which, in places, so obstructed progress that trenches had to be cut to permit the camels to pass. He spent two days in the depression of the Wádí Raiân, and he describes it as bordered, in his day, with shrubs, acacias, and some palms, so luxuriant in their growth that they concealed him from the Arabs, and permitted him to take his observations unseen; but this valley is now quite destitute of vegetation<sup>1</sup>. Beyond Wádí Raiân, Cailliaud left the route that had been followed so far by Belzoni<sup>2</sup> in May 1819, and took a course to the west and some degrees north. He first encountered numerous sand-dunes and springs of brackish water with some herbage, and further on passed over a desert tract covered with calcareous isolated rocks, and with a chain of hills to the north, the horizon to the south being lost in sands—the cold north wind being so intense that he was glad to avail himself of the shelter of some low hills. The next tract of desert passed over was covered with rounded pebbles, and in the hollows beyond there was a little herbage, then again in places great stretches of sand, with extensive dunes running south to north, due to the prevalence of the polar winds. In the last days of November, amid this sea of sand, he met with a little rain lasting about five minutes. Some marches beyond, over a similar desert, he sighted the eastern continuation of the escarpment of the plateau of Cyrenaica, which, viewed from the south, appears as a chain of mountains extending from the east, away in the distance, towards the west. He visited the basin of Ain Ouara, covered with reeds, shrubs, herbage, and palms, its centre occupied by a lake of saltish water full of reeds highly prized for mat-making. Several wells of sweet water exist here at the base of a sand-hill covered with shrubs. The cold of the morning at 7 A.M. was as low as 6°·8 Cent., but at 3 P.M. it was as much as 28° Cent. An immense plain borders the foregoing escarpment, occasionally broken by sand-dunes, and while crossing the plain some drops of rain fell one day in the afternoon. As the oasis of El Garah was approached a salt plain grooved like a ploughed field was crossed, and afterwards he descried in front of him a fertile valley with palms, acacias, and many herbs. Following this, an elevated desert covered with irregularities was passed over, to a high plateau from which a rapid slope descended to a plain studded with hillocks, but having herbage and shrubs, and, continuing onwards, the palm-groves of the oasis of Siwah became visible. He remained at Siwah from the 10th to the 25th December, and then retraced his steps in an easterly direction to the oasis of Bahariéh. The eastern portion of the Siwah district, across which Cailliaud and other travellers have passed,

<sup>1</sup> Brown (R. H.), *The Fayum and Lake Mœris*, 1892, p. 5.

<sup>2</sup> Narrative of the Operations and Recent Discoveries in Egypt and Nubia, 1820.

has been recently traversed by Mr. Jennings-Bramly<sup>1</sup>, who characterizes it as a "low-land" over 4 kilomètres in breadth, covered with halfa-grass. Beyond this there is a great salt plain "broken up into small pools of clear water glistening on beds of crystallized salt as white as snow."

The following Reptiles have been recorded from the oasis of Siwah, viz.:—*Chalcides ocellatus*, *Zamenis diadema*, *Cerastes vipera*, and *Echis carinatus*. Doubtless many more species occur, and it is probable that the majority of the more essentially desert forms having a wide range to westward over Northern Africa will be found in the different oases.

Leaving the depression of Siwah, the route rises to the summit of the plateau, here only 25 mètres above the sea. Cailliaud describes the desert beyond as very peculiar, consisting as it does of a multitude of small projecting rocks which hide everything from view. Further on small hillocks are passed, and then the oasis known as El Aradj is seen lying before the traveller, in a depression 70 mètres below the level of the Mediterranean, enclosed almost continuously by the bold limestone escarpment of the plateau, excavated by tombs attesting the former presence of permanent inhabitants; the cliffs surrounding this oasis are described by Rohlfs as perpendicular rocks 91 mètres high, of snow-white nummulitic limestone presenting fantastic forms. The floor of the oasis in Cailliaud's time was rich with the foliage of the date-palm, among which he observed some dhum-palms; but in Rohlfs's day the latter had seemingly disappeared, and recent travellers have remarked that its palm-groves generally are being buried under the advancing sand-drifts. The brackish springs and the vegetation they nourish are the breeding-ground of such multitudes of mosquitoes, that the place is uninhabitable. It is, however, now and again visited by the Arabs because the dates that remain are excellent in quality. Gazelles (*Gazella leptoceros*) abound around this oasis, and associated with them is the large jackal (*Canis anthus*), the so-called wolf of Egypt. Cailliaud mentions another ruminant under the name of "*baquar ou bœuf sauvage*." He describes it as being as large as a calf, and states that the sands were marked by its footprints. It may possibly have been *Bubalis boselaphus*.

The desert immediately to the east of Aradj, at an elevation of about 35 mètres above the sea, is strewn over with hillocks, and on its barren surface Cailliaud, on the 26th December, experienced two degrees of frost at 7 A.M., while at midday the thermometer had risen only to 19° Cent. The route continues to traverse similar ground until it reaches the margin of the depression of Uttiah, 30 mètres below the Mediterranean, with its date-palms, and in which Mr. Jennings-Bramly observed a few night-herons. Leaving this small oasis the route leads on over much the same kind of desert as that between Aradj and Uttiah to the edge of the hollow in which the salt lake of Sittrah lies, 25 mètres below the Mediterranean, or even still lower; it is

<sup>1</sup> Geogr. Journ., Dec. 1897, p. 606.

reached in three marches from the confines of Siwah. This salt lake was first made known to Europeans by Cailliaud, who was also the first to traverse the route which has since been explored by Pacho, Rohlfs, Zittel, Jordan, and other travellers. Rohlfs says that the Sittrah lake is defined on the north by a picturesque rocky chain and on the west and east by reeds; and Cailliaud mentions that on the south side, in his day, there was a great bank of sand with a few date-palms. When Rohlfs visited Sittrah the surface of the lake was covered with ducks and white ibis. About half a mile from its southern end, where the route passes, there is a fresh-water spring at the foot of a date-palm, and some marshy land covered with reeds; but here, as in Aradj, mosquitoes are so numerous that neither man nor beast can endure their attacks, and consequently a camping-ground has to be sought for further to the east, where there is a little herbage for camels. Cailliaud continued on to the oasis of Baharieh; and Jordan, when he separated from Rohlfs at the Sittrah lake, in 1874, followed a route slightly to the north of that taken by the French traveller.

As Rohlfs accompanied by Zittel proceeded to the oasis of Farafreh, a knowledge of this part of the Libyan desert is gained by their experiences. Along this route there are great collections of sand, not, however, in the form of continuous dunes, but as confused masses very difficult to cross, and giving rise to great fatigue. In proceeding from the Sittrah lake the route traverses an eastern rounded arm of the sand-sea, 47 mètres above sea-level, and then passes over a short western prolongation of the plateau 104 mètres high, to descend again to another arm of the sand-sea only 10 mètres above the Mediterranean, after which the plateau is once more reached, rising in a gentle slope to the south-east, until at the summit of the escarpment of Farafreh (Introd. Pl. V.) it is elevated 242 mètres above the Mediterranean. The distance between the Sittrah lake and Farafreh is accomplished in six marches; only traces of vegetation occur here and there along this route.

Cailliaud mentions that, after leaving the Sittrah lake, on his way to Baharieh, scant herbage was found, but after this, at the foot of a long mountain, there was a great extent of sand impregnated with salt, associated with which there was a small collection of saline water which his guide assured him had formerly constituted a part of the Sittrah lake. Beyond this point the desert rises to 47 mètres, again falling to 43 mètres, and rising once more to 80 mètres, followed by a descent to 38 mètres, with a high desert escarpment on each side of it. This slight depression is the well-known Bahr-belâ-mâ, which is bordered by rocks about 20 mètres high and partly by slopes and sand-dunes. Zittel states that this valley has nothing in common with a river but the name, and Rohlfs says it is of so little importance that it may henceforth disappear from the maps. It passes into the nummulitic plain to the east and at last into sand-dunes. As sand is less frequent on this route to Siwah than on that from the Fayum, Cailliaud supposed this was the reason why the ancients preferred it to the latter. Jordan, when in the neighbourhood of the Bahr-belâ-mâ (4th March)





Western Slope of Desert, at Farafreh.



Bab el Cailliaud, Oasis of Dakhel.



encountered a fall of rain at 10 A.M., lasting about an hour, but so slight that the moisture only penetrated the soil from a half to one centimètre in depth, and a little more rain fell in the evening. He afterwards ascertained that rain had also fallen at Farafreh, on the same forenoon.

The part of the desert between Bahr-belâ-mâ and Baharieh seems to be destitute of vegetable and animal life. Before the escarpment (194 mètres) is reached the route passes over rocks and amongst numerous hillocks. Five days are occupied in marching from Sittrah to Baharieh. The descent to this oasis, first visited in modern times by Belzoni, is much less steep than that of the escarpments of Siwah, Farafreh, and Dakhel, being not more than 20 mètres in depth. However, after the chief town has been reached, a further descent is made to the springs of the oasis, the approach to which is described by Jordan as the most beautiful he ever beheld, and reminding him of the descent to the oasis of Dakhel. It passes down over deep and large terraces, and around the springs are numerous palm-trees and bushes, and Mr. H. Weld-Blundell<sup>1</sup>, who has lately visited it, saw olives, oranges, and other fruits, and observed sheep, goats, and cattle.

Caillaud experienced great variations of temperature during his visit to the oasis of Baharieh. In the middle of January water froze overnight, and at 8 A.M. the thermometer was still only 3° Cent. above freezing, whereas at 3 P.M. it rose as high as 35° Cent. The inhabitants informed the traveller that rain falls every year in January.

Lefèvre, in 1828, found *Scincus officinalis* in the sandy parts of this depression, and the larvæ of a Salamander in the reedy marshes that occur in the neighbourhood of the springs and elsewhere.

From the oasis of Baharieh, Caillaud proceeded to that of Farafreh, first made known by himself and his fellow-traveller Latorzec. He ascended gradually to the south-western extremity of the former depression, where the route attains an altitude of 134 mètres. At this point the escarpment is scaled, and when its summit is gained the surface of the plateau is 193 mètres above the sea. The distance between the escarpments of the two oases can be traversed in less than two days. The great intervening plain is covered in places with isolated flat-topped mounds, but, as a rule, it loses itself in the horizon, and, owing to the whiteness of its calcareous scorched surface, the glare of the sun reflected from off it is almost unbearable to the traveller and his camels. It is apparently devoid of life, but whenever the escarpment overlooking the depression of Farafreh is reached, and a slight descent accomplished, the wearied eye is gladdened by the sight of vegetation, which appears only as small points of verdure in the immensity of the desert around these oases.

The mammals mentioned by Rohlfs are the inevitable so-called wolf-dog, jackals, fennecs, wild cats, mice, jumping mice, and bats; but beyond this most general statement, no further information is extant regarding the mammals of this oasis,

<sup>1</sup> Scottish Geogr. Mag. x. 1894, p. 472; Bull. Soc. Khéd. de Géogr. iv. sér. no. 4, 1895, p. 267.

which lies in a depression said by the same traveller to embrace an area of at least 2000 square kilom. Of the reptiles absolutely nothing is known, but among birds he enumerates vultures, ravens, sparrows, the reed-warbler, wagtails, quails, swallows, lapwings, and wild ducks. The products of the soil of this oasis according to Rohlfs are the never-absent date-palms, figs, prickly pears, both sweet and bitter oranges, lemons, olives, pomegranates, mulberries, the locust-tree, apricots, peaches, caraway-seeds, onions, garlic, radishes, turnips, carrots, wheat, oats, rice (sparingly), &c., with a little cotton. Acherson, during his visit to this oasis, collected 92 species of plants.

The climate of Farafreh, according to Rohlfs, is more thoroughly desert than that of any of the other oases. The cold at night in winter is great, and the heat in summer is unendurable. According to observations made by the same traveller in December, the temperature fell to  $-4^{\circ}$  one night, and rose only to  $20^{\circ}$  Cent. at midday; while in the middle of March it was also as low as  $+2^{\circ}$  during night, and did not rise above  $23^{\circ}$  Cent. in the middle of the day. Slight rain, as in the neighbouring oasis of Baharieh, falls in the months of January and February.

The thermal springs of this oasis have a temperature of about  $26^{\circ}$  Cent., but although they have a metallic taste they afford the best drinking-water of the Libyan desert.

Rohlfs's expedition first approached the oasis of Farafreh from Assiut. They ascended the limestone plateau at Mer, to the north of Assiut, on the 20th December, 1873, where it has an elevation of 96 mètres above the sea. They passed over a gravelly desert covered with coarse sand, and between low limestone hills, with Jebe Ismail to their left. On this part of the desert they met with a few plants such as *Traganum undatum*, *Fagonia arabica*, *Aristida plumosa*, *Anabasis articulata*, *Cornulaca monacantha*, and a species of *Salsola*. The desert rises to 118 mètres, and, beyond, Rohlfs and his party found some shallow wádís and gravelly ground covered with sand, in places strewn with Nummulites. Vegetation was still represented by such plants as *Caroxylon fatidum*, *Farsetia aegyptiaca*, *Calligonum comosum*, *Ephedra alata*, *Aristida plumosa*, and *A. zittelii*. Sand-dunes were afterwards encountered running north and south, and beyond them more vegetation, the desert continuing to rise so that on the 24th December they were at an elevation of 219 mètres above the sea. The route was still enlivened by the sight of a few plants of species already mentioned, and after the travellers had passed some low hills they reached, on the 26th December, the watershed between the depression of Farafreh and the Nile, at an elevation of about 280 mètres above the Mediterranean. A sparse vegetation was still present, and after descending 42 mètres down the plateau, they were astonished to meet with many trees of *Acacia Seyal* and numerous plants of *Francoeuria crispa*. Beyond this there was a slight ascent to the escarpment of the depression which, at the "Eng Pass," was found to be 260 mètres above the sea. Between the watershed and the escarpment they met with distinct traces of rain in the low ground and in the hollows in the form of a slimy encrustation several centimètres in thickness. The



descent to the first of the fertile spots on this side of the depression is extremely steep and rugged. At the foot an abundance of *Alhagi manniferum* was met with, along with clumps of tamarisk, *Calligonum*, and wild palms.

No mention has been made of any animal life having been observed by the members of Rohlfs's expedition along this route, but the comparative abundance of vegetable life evinced by the number of species recorded sanctions the supposition that animal life is equally well represented. The disturbance necessarily created by the passage of a large caravan through the intense and noiseless repose of the desert would scare animals away, and this doubtless largely accounts for the meagre reference to their presence by travellers. Moreover, the winter, as has been before pointed out, is a season of torpidity with reptiles, and, besides, not a few are nocturnal in their habits and have to be specially sought for by turning over stones and by searching carefully in crevices of rocks and at the roots of plants.

The desert between Farafreh and Dakhel begins to rise at Bir-Dikker, 95 mètres above the sea, and at this point a great zone of sand extends nearly to the northern escarpment of the oasis of Dakhel. In the neighbourhood of Bir-Dikker, Jordan met with *Zygophyllum album*, *Acacia nilotica*, *Juncus maritimus*, tamarisks, isolated date-palms, and some other desert plants; but between this portion of the Farafreh depression to near the Dakhel escarpment he saw no vegetation. However, at the southern end of the zone of sand he found some bushes of *Fagonia arabica*; and at this part of the plateau, 370 mètres above the level of the sea, Rohlfs afterwards observed *Anabasis articulata*. Two species of *Acanthodactylus*<sup>1</sup>, viz. *A. boskianus* and *A. pardalis*, were obtained by the Rohlfs Expedition, probably either at Bir-Dikker or to the southward of the sand zone. Cailliaud describes the route as traversing at first a more or less sandy limestone plain, and afterwards a tract of sand many kilomètres in length, forming a narrow valley along which it passes. It then ends in another plain strewn with irregularly-shaped little rocks, its surface cut up and waved superficially as if by water flowing towards the north. The summit of this plain is covered with jagged conical hillocks, giving a wild and imposing aspect to the scene and constituting a perfect labyrinth of rocks. The highest part just before the descent is made into the depression of Dakhel lies 445 mètres above the level of the sea. From the edge of the escarpment the traveller, for about half an hour, descends through magnificent scenery, between the upper Pass or Bab-el-Jasmund, and the lower Pass or Bab-el-Cailliaud (Intro. Pl. V.), so called by Rohlfs in honour of the French traveller. In these passes, but especially in the lower, sand accumulates in great drifts, very difficult to traverse owing to its loose and shifty character.

Sir Archibald Edmonstone and his companions seem to have been the first Europeans who, in modern times, visited this oasis of Dakhel (Intro. Pl. VI.). Their visit took

<sup>1</sup> These two species have been included in the Table of Distribution under Oasis of Dakhel, as they were found in that neighbourhood.

place in February 1818. They approached it from Assiut, and were nearly five days crossing the desert, which is at first a vast level plain, but as the route advances the desert varies much, and in some places occur hills of considerable magnitude; the sand is rarely deep except when drifted into dunes. The day before Edmonstone reached the oasis he saw "coveys of partridges" (probably sand-grouse migrating), 70 to 80 miles distant from vegetation of any kind, and he states that lions and tigers! (leopards?) were said to be not uncommon in his day in the Oasis of Dakhel.

Drovetti<sup>1</sup>, who visited this oasis about the same time as Edmonstone and Cailliaud, describes the district contiguous to the village of Besendí as well watered by two streams, bordered with very ancient and beautiful trees of *Acacia nilotica*.

The thermal springs of this oasis, some of them impregnated with sulphur and having a temperature of 27° to 36° Cent., may be said to be situated in a great plain about 100 to 110 mètres above the sea, and which rises to the west and north-west, and in the former direction from Kasr Dakhel stands an isolated mountain, Jebel Edmonstone, the name being given by Rohlfs in honour of the British traveller. It is a prominent object in the landscape, and to the west of it the region of sand begins to show itself. The escarpment (Introd. Pl. VI.) which defines this depression to the north rises in bold cliffs that shelter it somewhat from the cold north winds.

Three species of reptiles were obtained by the Rohlfs Expedition in this oasis, *Varanus griseus*, *Scincus officinalis*, and *Cerastes cornutus*, and one batrachian, *Bufo viridis*; but as the Dakhel oasis abounds in springs and ditches, the moist soil around them being clothed with a variety of verdure, reptilian and batrachian species are probably better represented in it than in any of the other oases. It is rich in vegetation, as Acherson collected more than two hundred species of plants, comprising some Western Saharian forms, but, curiously enough, to the exclusion of the widely spread *Plantago major* present in the oases of Farafreh and Khargeh.

Rohlfs and his companions, Zittel and Jordan, attempted to penetrate the desert to the west of Dakhel, but when they had reached a point about 450 mètres above the level of the sea they were compelled to abandon the attempt by reason of the immense sea of sand-dunes which they encountered. They therefore directed their course to the N.N.W., and proceeded towards the oasis of Siwah along a route previously unexplored. On this journey they had their first experience of a continuous rain in the Libyan desert. It began at 6 A.M. on the 2nd of February and lasted until 2 P.M. on the 4th February; 16 mm. fell, and the rain penetrated the sand to a depth of 17 cm. They afterwards ascertained that nearly quite as much rain had fallen at Dakhel and at Khargeh, but that only a little had been observed at Farafreh, while none had fallen at either Baharieh or at Siwah. On account of the rain that had fallen, they named the place Regenfeld. Beyond, the route descends gradually from 450 mètres above the sea to 30 mètres on the southern escarpment of the oasis of Siwah. Their

<sup>1</sup> Phillips's New Voy. and Travels, (3) vol. vii.



Desert Landscape, near Dakhel.



Oasis of Dakhel, Escarpment of Plateau in the distance.





journey from Regenfeld to the oasis was accomplished in twelve marches; but they found much difficulty in travelling, having met with a sand-storm and being exposed to a cold chilly north wind. Vegetation was noticed only at one spot. On their fifth march, at Zittel's Ammonite hill, which marks a depression 250 mètres above the sea, defined to the north by an escarpment 100 m. high, an example of *Cœlopeltis monspessulana*, several feet in length, was captured lying in a cleft of rock. Nothing was found in its stomach except sand, but other animal life had been present, as it is stated that the snake fed either on small insects, lizards, mice or jumping mice, and it is added that a few plants were present, especially the grass, *Aristida plumosa*.

In the Regenfeld the temperature at 6 A.M. from the 28th January to the 4th February varied from 2° to 11°·9 Cent., and at 2 in the afternoon during the same period from 9°·4 (after rain) to 20°·8 Cent. The rainfall experienced by Rohlfs was, however, quite exceptional. When rain does fall in this part of the desert, it is restricted, as a rule, to the months of January and February, and it generally assumes the form of gentle showers occurring now and again after years of absolute drought. An occasional thunderstorm may very rarely occur at other seasons, attended by a few drops of rain.

The oasis of Khargeh was visited by Poncet on his journey from Assiut southwards towards Abyssinia in the closing years of the 17th century, and by Browne a century later. Drovetti, Consul-General of France in Egypt, also passed through Khargeh on his journey to Dongola and Dar-Fur prior to 1818; and Sir Archibald Edmonstone and his companions, after they had visited the Dakhel oasis, proceeded to Khargeh by the usual route across a southward projection of the Libyan plateau to Ain Amur. In June 1818, Cailliaud, after the completion of his observations in the Eastern desert<sup>1</sup>, was at Esneh preparing for his journey to the oasis of Khargeh. He started on the 26th June, and in the latter part of the same year Drovetti again visited the oasis of Khargeh and passed on to Dakhel. Since their days these oases have been visited by many Europeans, who have published the results of their observations, while others, it is to be regretted, have not done so. Towards the end of June, when Cailliaud reached the plateau, he suffered severely from a scorching south wind, against the full blast of which he traversed an enormous sandy desert, dotted over with little hills. The courage and enthusiasm of the young traveller, however, were soon rewarded by a change in the wind, which veered round to the cooler north. On the fourth day, he passed down a defile and thus began his descent to the depression in which the oasis of Khargeh and its minor oases stud the monotonous, barren, yellow plain like green islands. Along his route he had noticed neither vegetable nor animal life, but Rohlfs, who, many years afterwards, followed the same route, in the month of March, however, met with nearly the same plants as those with which he had been familiar on his march from Assiut to Farafreh in the month of December. The circumstance that

<sup>1</sup> 'Travels in the Oasis of Thebes and in the Deserts East and West of the Thebaid, 1815-1818,' see Phillips's *New Voy. and Travels*, (3) vii. 1822.

Cailliaud's journey was made in June probably accounts for the disappearance of all vegetation, whilst Rohlfs's visit, besides being made in winter, took place in a year remarkable for its exceptionally heavy rainfall.

The oases of the Khargeh depression cover an area 120 kilomètres in length. The chief oasis lies 69 mètres above the sea. It has the same productions as those of the other oases, and it is especially well supplied with water. Cailliaud affords absolutely no information about its fauna.

Hoskins<sup>1</sup>, who visited Khargeh, in 1835, states that wolves, hyænas, and gazelles found a favourite resort among the rocks of an eminence, surrounded by sand-dunes, on which two convents stood. Some definite information about its reptiles was obtained by the Rohlfs expedition, who found an *Agama* (!*sinaita*) and *Chalcides ocellatus*, to which have to be added *Eremias rubropunctata* collected by Professor Sickenberger, and *Psemmophis schokari* from Berys, one of the oases to the south, where it was procured by Major Lyons. It was the latter oasis to which Cailliaud first directed his steps after leaving the small oasis of Hagegeh, situated on rising ground covered with sand, but bearing a few dhum-palms and some date-trees, with orchards, and fields of dhurra irrigated from a spring of fresh water. The village of Berys, on an elevated rock, has near it some copious springs of hot water, varying in temperature from 26°·6 to 32°·2 Cent., one of which, Cailliaud says, issues with such force from the middle of a pond that a person descending into the cavity whence it bubbles forth would be carried away by it. Like all such hot springs in the oases, these are used for irrigation. Cultivation is here carried on under great difficulties, as palisades, made from the stalks of the date-palm, have to be erected as a protection against the steady inroads of the desert sands.

Schweinfurth<sup>2</sup>, who visited the oasis of Khargeh, in 1874, advanced from Assiut and retraced his steps to the Nile by Girgeh. In his references to the animal life of the oasis, no mention is made of either Reptiles or Batrachians, except a passing allusion to lizards. Although springs, brooks, and ponds abound, he affirms that no fish are present, and that, owing to the damp summer miasma and plagues of midges, it has been found impossible to acclimatize the camel; but, on the other hand, donkeys, sheep, and cattle are easily reared. Schweinfurth found five species of carnivorous Mammalia, animals which he says are almost without exception nocturnal, but by the aid of traps he succeeded in obtaining a great number of them. The species he enumerates are the dog-wolf, the Libyan cat, the dog-hyæna (*Canis pictus*), the jackal, and the Nile fox. The food of the last two, he states, consists largely of rodents (viz. *Dipus* and *Gerbillus*) and lizards, in which the desert abounds. Locusts, fowls, and domestic pigeons also are plentiful. Besides these, he mentions two species of antelopes of the oasis under the names of *Antilope dorcas* and *A. dama*. He

<sup>1</sup> 'Visit to the Great Oasis of the Libyan Desert,' by G. A. Hoskins, 1837.

<sup>2</sup> Bull. Soc. Geogr. Paris, 1874, 6 sér. vii. p. 627; Brit. Assoc. Rep. 1874, p. 173.

contradicts Edmonstone's statement about the existence of the lion, which he says is unknown. The temperature and rainfall of this oasis are much the same as in Dakhel.

To the east of the oasis of Khargeh, and between it and Assuan, lies the small but little-known oasis of Kurkur.

About 500 species of wild and cultivated plants were collected by Acherson in the oases of Farafreh, Dakhel, and Khargeh. The greater proportion of these species have been found to be of European origin, whereas the majority of the wild and cultivated plants of Egypt are essentially African in their descent. The strong affinity which the flora of the oases presents to that of Europe sanctions the inference which has been put forward in explanation of it, viz., that the area of the Libyan desert in which the depressions lie had been directly continuous with the lands of the Western Mediterranean before it had formed part of Egypt. It remains yet to be ascertained whether the fauna of the oases will also favour a similar conclusion. The foregoing relations between the flora of the oases and that of Europe should, however, be kept in view in studying the eastern distribution in North Africa of south-western European species of reptiles, one or more of which have been reported as far east as the Delta, and one species in the south-east even as far as Somaliland.

Major Lyons<sup>1</sup>, who has traversed the portion of the Libyan desert immediately to the south of the oases of Khargeh and Dakhel, describes it as a sandstone plateau falling away towards the north. A few hills rise from the plateau, but they are never more than 61 to 76 mètres above its level. The sandy desert of this great region is almost destitute of vegetable and animal life, except in the neighbourhood of some other oases to the south, such as the oasis of Selima on the caravan-route between Assuan and Dar-Fur, and in the Wádí el Kab to the west of Dongola. The former is of no great extent, and lies in an undulating plain, over which low rocks are scattered, and it is surrounded more or less by a low escarpment. Browne rested at this oasis for a day in the month of June, 1793, on his way to Dar-Fur. He describes it as a verdant spot at the foot of a ridge of rocks of no great height, affording the best water along the route, but devoid of vegetation "fit for the support of either man or beast." Cailliaud, however, in 1822, found tamarisks and date-palms in this small oasis. The Wádí el Kab lies to the west of Dongola. It is a depression below the level of the high Nile, and is shut off from the river by rising ground about 5 to 6 kilom. in breadth, beyond which the land slopes to the west in a succession of terraces for about a distance of 11 to 12 kilom., when the edge of the oasis is reached, defined by low cliffs. It is about 200 kilom. in length, and in some places 8 kilom. in breadth. It is plentifully supplied with water, as there are numerous springs and sheets of water, and consequently there are groves of date-palms and other trees and sufficient pasturage to support the flocks of the Kababish Arabs who frequent it. Its southern end lies within the extreme northern limit of the area of periodical rains.

<sup>1</sup> Quart. Journ. Geol. Soc. l. 1894, p. 531.

Owing to its fertility and geographical position, an investigation of its fauna would probably yield interesting results.

Before leaving the oases of the Libyan desert, the Fayum and the Wádi el Natrun require to be noticed. The first of these depressions is surrounded by the desert, except at the point where the Bahr Yûsuf enters it, but the interspace is so narrow, being not more than four to twelve kilometres in breadth, and the intervening heights are so low, that the Fayum may be considered as a part of Egypt proper, so far as its zoology is concerned; and, in connection with this, the Fayum is interesting as being the northern limit to the distribution of the egg-eating snake, *Dasyptis scabra*. It is in no sense isolated from the valley of the Nile, as the course of the Bahr Yûsuf is marked by cultivation linking its fields with those of the Nile.

The valley of the seven or eight permanent Natron lakes, visited by Browne in May 1792, and seven years later described by Andréossy<sup>1</sup>, is separated from the Nile by a shingly desert about 39 kilom. in breadth. It is usually approached from near Teraneh, and when the road reaches the low-level summit of the undulating plateau which slightly ascends towards the west, it at last begins to descend to the ridge of the valley which is of no great height. The depression in which these lakes, ponds, and shallow morasses are situated is supposed to lie below the level of the Nile. It is 36 kilom. long and is about 12 kilom. in its broadest part, but the actual plain, which is more or less covered with low isolated hills and banks of sand, is much narrower. The water in the shallow basins begins to rise towards the end of September, and continues to do so until the end of December, but in summer many of the smaller basins completely dry up. During the foregoing period the water oozes up on the eastern side of the valley and flows down to the basins in blood-coloured streams due to the presence of some minute organisms. A certain amount of water is also supplied to them by the winter rains. Browne states that no vegetation was visible during his visit except the reeds on the margins of the lakes; but Wilkinson<sup>2</sup>, in 1842, found that, although the valley possessed no trees, the usual plants of the desert, including some tamarisk bushes and stunted palms, were also present, besides reeds and rushes deriving their support from springs of fresh water.

An antelope and the ostrich were, according to Browne, the only wild animals that frequented that part of the country in his time, but Wilkinson mentions the presence in the Natron valley of a gazelle (? *G. leptoceros*), a jerboa, and foxes, besides a few of the other common animals of the Libyan hills. In James Burton's manuscripts in the British Museum, the interesting fact is recorded that *Trionyx triunguis* existed in the waters of the Natron Lakes. If this observation was correct, it is of considerable importance, as it may be inferred from it that the Wádi el Natrun had been at some period of its history in direct relation with the Nile. The chameleon is said to occur in the valley, and very explicit statements have been made by some of my informants as to the presence of the wild pig on its sedgy ground.

<sup>1</sup> Mém. sur l'Égypte, i. (1790-1810), p. 223.

<sup>2</sup> Journ. Geogr. Soc. 1843, p. 113.



The physical features of the escarpment of the Libyan plateau along the Nile are well illustrated by the views on Intro. Pl. VII., for which I am indebted to Professor Flinders Petrie. The portion of the escarpment defining the Nile Valley in Lower Egypt is markedly different from the escarpment at Naquada, below Thebes. In the former region, the plateau generally approaches the Nile as low rounded spurs about 200 mètres above sea-level, separated frequently by shallow valleys the floors of which are more or less covered with loose stones, or it may be with fragments of shattered limestone, with accumulations of drifted sand, here and there, in the hollows. At Naquada, on the other hand, the escarpment has a very rugged configuration and rises to 500 mètres above the sea. It is cut up into ridges separated by deep ravines, some of the latter of considerable length and depth, and presenting the appearance, remarkable in an almost rainless desert, as if they had recently contained running streams. Similar valleys occur throughout the escarpment, but none perhaps having the foregoing characters better defined than those of Naquada. Along these valleys vegetation generally finds its way and spreads on to the plateau, as has been illustrated by the itineraries of the travellers whose observations have been cited. Between the base of the escarpments and the alluvium, on both sides of the Nile, there is usually a foreshore, so to speak, of shingly land supporting a straggling and sparse vegetation of ordinary desert plants, more or less merging with the vegetation of the alluvium. This foreshore, the wide plains that occasionally separate the elevated desert from the Nile, the escarpments with their valleys, and the immediately adjoining surface of the plateau are the areas over which animal life is chiefly distributed, so that an enumeration of the species found on these areas would practically embrace the reptilian fauna of the Nile Valley. The annual submergence of the alluvium is the reason why so limited a number of species is found on the cultivated area. In the months when the fields are devoid of water and the soil is once again nearly dry, a number of lacertine genera are temporarily distributed over it, such as *Agama*, *Acanthodactylus*, *Eremias*, and *Mabuia*; and along with them such genera of snakes as *Eryx*, *Zamenis*, *Psammophis*, *Tarbophis*, and *Naja*. Certain mammals also which have their lairs, as a rule, among the rocks of the escarpments or on the neighbouring plateau, find a safe shelter and an abundant supply of food amid the fields of beans, cereals, and sugar-cane.

The climate of the narrow area enclosed by the escarpments of the desert defining the course of the Nile differs but little from the climate of the great regions immediately to the east and west of the river. The rainfall is about the same in all, but in the lower part of the valley the climatic conditions of the Mediterranean basin occasionally make themselves felt. It cannot be said that the narrow valley is entirely devoid of rain, as seasons now and again recur when it falls in places in gentle showers. Frequently, however, years may pass without a drop of rain falling, and thus vegetation beyond the influence of the Nile floods becomes completely burned up with the exception of a few hardy acacia-trees, and consequently many of the small mammals die, whilst the larger forms are driven elsewhere in search of food.

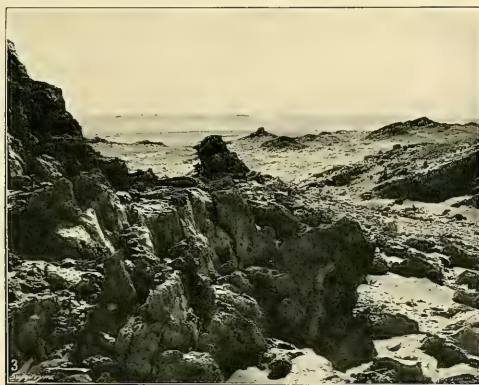
The physical features of both sides of the Nile indicate the existence of a period long antecedent to the present, in which a considerable rainfall prevailed, as in the eroded valleys of the desert there may be observed rocky ravines which have been carved out by the action of water, which has left behind it dry channels over which waterfalls had once precipitated themselves, and others down which cataracts had once raced. The rainfall of the present is not sufficient to account for such a degree of erosion, unless it be supposed that it has been prolonged over an almost incalculable period of time, a supposition which does not meet with support when other considerations are brought under review. On the other hand, the entire evidence seems to sanction the conclusion that a material change in the character of the climate of North-eastern Africa, so far as its rainfall is concerned, has taken place since the days when the ancient Egyptians represented on the monuments of Sakkarah the various animals with which they were familiar. The camel was seemingly unknown to that ancient people: at least no figure of it has been bequeathed by them to us, whereas, for example, representations of the elephant<sup>1</sup> are present, and on ivory carvings of an almost prehistoric age figures of elephants are found associated with others of the ibex of the Arabian desert. The elephant, rhinoceros, hippopotamus, lion, and hyæna, along with some other large mammalia, existed in Central Europe in Miocene times, but were then unknown in Africa, which they reached only at a comparatively modern period. From the nature and habits of some of these animals it is self-evident that the climate then must have been a moist one and with a rainfall which ensured an abundant supply of vegetation and water. The gradual disappearance of this rain and consequent slow conversion of North-east Africa into a semi-desert led to the retirement southwards of the larger of these mammals to the region of periodical rains.

Besides the slight and rare rainfall along the course of the Nile Valley, a certain amount of dew falls at night even on the desert. In winter the dew on the plants on the cultivated lands has now and again been noticed in early morning sparkling with icicles, whilst the surface of the desert may in places be white with hoar frost.

The intense heat of the desert is the cause of a great indraught of cold air from the north during the greater part of the year, so that winds from that quarter are six times more prevalent than those from the south. In March to May the hot *khamsin* charged with dust blows sometimes for days at a time, while the sun is above the horizon, drying up vegetation and exhausting animal life.

The great triangular level alluvial expanse of the Delta of the Nile is enclosed on its eastern and western sides respectively by the Arabian and Libyan deserts. Nearly the whole of the seaward face of the Delta is occupied by a series of great lakes and swamps of brackish and even saline waters, surrounded more or less by sedgy banks. These extensive lakes are separated from the sea by sand-dunes, generally resting on a solid reef, made up of sea and freshwater shells, which forms a barrier against the encroach-

<sup>1</sup> The elephant is unmistakably represented in Roman mosaics, &c., in Tunisia. Johnston, P. Z. S. 1898, p. 353.



No. 1.—Escarpment of desert plateau at Abu Roash. Alt. about 183 mètres above Nile.

No. 2.—Desert plateau, behind Gizeh, looking south-west. Alt. about 76 mètres above Nile.

No. 3.—Outcrop of limestone desert, behind Gizeh, looking eastward across Nile to Mokattam hills. Alt. about 122 mètres above Nile.

No. 4.—View from top of escarpment of desert plateau above Naquada, looking across Nile valley to the eastern desert. Alt. about 365 mètres above Nile.

No. 5.—View from top of plateau above Naquada, looking westward down a valley of the desert. Alt. about 426 mètres above Nile.

No. 6.—View through cleft from top of plateau above Naquada, looking into Nile valley. Alt. about 426 mètres above Nile.





ments of the Mediterranean. In the neighbourhood of these lakes, between the two deserts, is a tract of land lying almost at the level of their waters and covered with a low scrubby vegetation. To the west of Lake Maryut low, rounded, detached ranges of hills extend to the south-west, their stony slopes covered, more or less, with a variety of plants, and the depressions between them, near the lake, yielding crops to the inhabitants of some straggling villages.

Owing to its proximity to the Mediterranean, the Delta, but more especially the region of the lakes, is subject to all the vicissitudes of the climate of that sea, the south-eastern extremity of which, however, is not liable to a heavy rainfall. Winter is the season of rain, and, on the coast at Alexandria, the mean annual rainfall, from 1873 to 1881, was 215·70 mm., whereas, at Cairo, the mean annual discharge is only about 33 mm. The former city is now and again visited in winter by storms of rain accompanied by high winds, which in their destructive effects, on the trees of the gardens in and around the city, almost remind one of the havoc wrought by an eastern cyclone. These storms make themselves felt even as far as Cairo, where the rain occasionally falls in such quantities as to flood the streets. They may also reach the plateau of the desert between Gizeh and Sakkarah, and crossing the valley precipitate themselves, sometimes accompanied by hail, in such torrents on the mountains near Heluan that the floods in their rush to the Nile scour out the deep wádís of the desert and have been known to carry away even a village and railway-culvert in their course. The Mediterranean storms from the north-west also, now and again, extend to Suez, even as late as April, when the rain may fall for many hours as a cold drizzle driven by a strong wind.

The air of the Delta contains a considerable amount of moisture, especially abundant during the prevalence of sea-breezes, and at night it precipitates itself as a heavy dew, exercising a wonderfully refreshing influence on vegetation.

The mean annual temperature of the Delta, at the sea, is about 20° Cent., and that of Cairo is about two degrees hotter. The mean winter temperature of the former area is 14°·44 Cent., and the mean summer temperature 30°. The winter and spring mean temperatures of Cairo are somewhat lower than the corresponding means of the coast-line, whereas its summer heat is greater.

The reptiles of the Delta are chiefly found on the semi-desert areas that enclose it, on those skirting the lakes, and along the coast-line with its sand-dunes; but many species have also a wide range over the Delta proper, as they appear generally wherever there is elevated ground. Only one species of the caudate batrachians is known to be present in the Delta; but although the species of the ecaudate section do not exceed five in number, some of them are represented during the period of high Nile by multitudes of individuals.

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## ZOOLOGICAL LITERATURE BEARING ON THE AREAS TREATED OF IN THIS WORK.

FROM the time of the visit of Herodotus to Egypt until Hasselquist's day a long list of authors, including Aldrovandus and others, might be quoted who dealt, more or less, with the animals of the country, but whose descriptions were invariably confined, so far as Reptiles were concerned, to the crocodile, land-tortoise, Nile turtle, *Stellio*, waral, scink, chameleon, asp, horned viper, hornless *Cerastes*, and flying serpents. The distinguished Arab traveller and physician of Baghdad, Abd-Allatif<sup>1</sup>, who visited Egypt in the 14th century, mentioned nearly all of these animals. In later years (1546-49) the careful and observing Belon<sup>2</sup> did the same, and did not omit to bring in the winged snake or dragon, in which he apparently so firmly believed that he gave the figure of one, a creature of his own and of his artist's imagination.

Prospero Alpini<sup>3</sup>, physician to the Consul of the Venetian Republic in Egypt, who resided at Cairo from 1581 to 1584, may next be noticed, as he paid particular attention, not only to the botany of Egypt, but also to the zoology of the country, to which he devoted the fourth book of his 'Rerum Ægyptiarum.' In the fourth chapter, the serpents common in Egypt, and, in the fifth chapter, "the animals of the lizard tribe which dwell there," are described. The lizards are restricted to the *Seps*, *chameleon*, *scink*, and crocodile, but what he meant by the first-mentioned and the *scink* it is impossible to say. His description of the snakes is equally unsatisfactory, and his treatment of both of these sections of animal life leads to the belief that his statements were largely based on hearsay; it should, however, be remembered that the 'Rerum Ægyptiarum' was published after his death.

The writings of Shaw<sup>4</sup> and of Pococke<sup>5</sup> do not add to our knowledge of the fauna of Egypt.

A period of almost 200 years elapsed after Belon before the appearance of the next really important work on the zoology of Egypt, the materials for which had been collected by Linnæus's pupil, Frederick Hasselquist<sup>6</sup>, born at East Gothia on the 3rd January, 1722. When he was twenty-five years of age he listened to one of Linnæus's botanical lectures, in which the great Swede deplored the ignorance that then existed regarding the natural history of Palestine. Hasselquist became fired with an enthusiastic desire to be the first to make it known; but Linnæus, being aware of the indifferent state of his pupil's health and of the difficulty of raising money for such an

<sup>1</sup> Relation de l'Égypte, par Abd-Allatif, par M. Silvestre de Sacy. 1810.

<sup>2</sup> Les Observations de Plusieurs Singularitez, &c. Paris, 1554.

<sup>3</sup> Rerum Ægyptiarum. 1735.

<sup>4</sup> Travels and Observations relating to Barbary. 1738.

<sup>5</sup> A Descr. of the East, &c. 1743.

<sup>6</sup> Iter Palæstinum. 1757.

object, tried all in his power to dissuade him from entering upon so arduous an undertaking, without success, however, as Hasselquist signified his intention to walk all the way on foot rather than have his desire frustrated. A small sum, however, was contributed by a few public-spirited individuals, and, as it was afterwards supplemented from some other sources, he was ultimately in a position to undertake the journey. A free passage to Smyrna having been granted to him by the Levant Company, Hasselquist sailed for the East on the 7th August, 1749, arriving at Smyrna on the 26th November, and after a residence in that town of about four and a half months he set out for Alexandria, which he reached on the 13th May, 1750. He resided there for a short time, and afterwards proceeded by Rosetta to Cairo, where he arrived in the month of July. His residence in Egypt extended over nearly a year. He left the country by Damietta on the 28th March, 1751, and visited Palestine, where he spent about seven weeks. Thence he sailed to Cyprus, Rhodes, and Chios, and he landed again in Smyrna in the beginning of August of the same year.

His life in Cairo, where the greater part of his time was spent, was but little conducive to an attainment of a knowledge of the natural history of Egypt, which was then, he says, governed by rebels who had been slaves, and under whose rule Christians were so despised and badly treated that he had to live in a kind of civil arrest and to keep his chamber. When he ventured out into the town or country, he had to commit himself to the hands of soldiers, who conducted him with staffs and pikes amid their "villainous brethren"; and he adds that to travel to Cairo in those days and to live there for some time was like doing penance for crimes. It is thus apparent that he had great difficulties to contend with in prosecuting his natural-history researches.

In the posthumous work, the 'Iter Palæstinum,' the following species are indicated:—

<i>Lacerta crocodilus</i> , Hasselq. & Linn.	= <i>Crocodilus niloticus</i> , Laur.	[Cope.
„ <i>chamæleon</i> , Hasselq. & Linn.	= ? <i>Chamæleon vulgaris</i> , Daud., or ? <i>C. basiliscus</i> ,	
„ <i>stellio</i> , Linn.	= <i>Agama stellio</i> (Linn.).	
„ <i>ægyptia</i> , Hasselq. & Linn.	= <i>Uromastix ægyptius</i> (Hasselq. & Linn.).	
„ <i>gecko</i> , non Linn.	= <i>Ptyodactylus hasselquistii</i> (Donndorff).	
„ <i>scincus</i> , Hasselq. & Linn. <sup>1</sup>	= <i>Scincus officinalis</i> , Laur.	
„ <i>nilotica</i> , Hasselq. & Linn.	= <i>Varanus niloticus</i> (Hasselq. & Linn.).	
<i>Coluber vipera</i> , Hasselq. & Linn. <sup>1</sup>	= <i>Cerastes vipera</i> (Hasselq. & Linn.).	
„ <i>cornutus</i> , Hasselq. & Linn. <sup>1</sup>	= „ <i>cornutus</i> (Hasselq. & Linn.).	
„ <i>haje</i> , Hasselq. & Linn.	= <i>Naja haje</i> (Hasselq. & Linn.).	
<i>Anguis jaculus</i> , Hasselq. & Linn.	= <i>Eryx jaculus</i> (Hasselq. & Linn.).	
? „ <i>colubrinus</i> , Hasselq. & Linn.	= ? „ <i>thebaicus</i> (Hasselq. & Linn.).	
„ <i>cerastes</i> , Hasselq. & Linn. <sup>1</sup>	= „ <i>jaculus</i> (Hasselq. & Linn.).	

<sup>1</sup> First described in the Act. Ac. Sc. Upsal., 1751.

Linnæus, who had access to the whole of Hasselquist's collection when he edited the 'Iter Palæstinum,' described, in the 12th ed. of the 'Syst. Naturæ,' the following snakes, which he states had been collected by Hasselquist in Egypt, viz.: *Coluber situla*, Linn., *Coluber jugularis*, Linn., and *Coluber tyria*, Linn. The type specimen of the first of these serpents is still preserved in the Stockholm Museum, and it proves to be the snake described by Bonaparte, in 1839, as *Callopeltis leopardinus*. The specimen of *Coluber jugularis* is the exact equivalent of *Natrix gemonensis*, Laur., = *Zamenis gemonensis* (Laur.) var. *asiana*, Boettger, but as it cannot unhesitatingly be accepted as the type of the species, the latter name will stand. The type of *C. tyria*, Linn., has unfortunately been lost, and the description is so indefinite that only a vague guess can be made regarding it. It appears from Hasselquist's correspondence that he sent only six species of snakes from Egypt; and keeping in view the fact that neither *Coluber situla*, Linn., nor *Zamenis gemonensis* (Laur.) has ever been recorded from Egypt, on reliable evidence, since the 12th edit. of the Syst. Nat. appeared, the possibility suggests itself that these two species were never obtained in Egypt, but that they formed part of Hasselquist's collection from one of the other localities visited by him.

Linnæus, in the Catalogue of the Museum of Adolphus Frederick, records *Vipera lebetina* as an Egyptian snake; but in the 12th ed. of the Syst. Nat. "*Hab. Oriente*" is substituted for Egypt, and Hasselquist's name is omitted.

The Danish expedition under Niebuhr, of which Forskål was the biologist, visited Egypt; and in the latter's posthumous work<sup>1</sup> the turtle of the Nile is indicated as *Testudo triunguis*, Forskål = *Trionyx triunguis* (Forskål), and a common North-African lizard is named *Lacerta ocellata*, Forskål = *Chalcides ocellatus* (Forskål). A snake he met with in Cairo he named *Coluber guttatus*, but the details he gave regarding it are too vague to admit of its determination. The same is also true of the lizard from the desert about Cairo named by him *Lacerta herbai*.

W. G. Browne<sup>2</sup>, of Oriel College, Oxford, made some adventurous journeys in Egypt between 1792-1798, and on his visit to Dar-Fur, which was protracted over a period of three years, owing to his enforced detention, he made some natural-history notes, but they were unfortunately lost at Alexandria. He, however, mentions the presence at Dar-Fur of a cobra which he calls *Naja haje*, and of the snakes *Coluber vipera* and *Anguis colubrinus* (= ? *Eryx thebaicus*), and an abundance of chameleons.

Guillaume Antoine Olivier<sup>3</sup>, while on his way to Persia, spent about the last six months of 1794 and the first few months of 1795 in Lower Egypt. He described from the sands of Rosetta the scink now known as *Mabuia vittata* (Olivier), and also

<sup>1</sup> Descr. Animalium. 1775.

<sup>2</sup> Travels in Africa, Egypt, and Syria. 1799.

<sup>3</sup> Voyage dans l'Empire Othoman, l'Égypte, &c. 1801.



collected, according to A. Duméril, examples of *Tarentola mauritanica* (Linn.); but this gecko first appears in literature, as an Egyptian species, in Daudin's 'Reptiles'<sup>1</sup>, under the name of *Gecko fascicularis*, Daud.

The close of the eighteenth century is memorable by reason of the French Expedition to Egypt. The principal zoologists who accompanied this Scientific Mission were Étienne Geoffroy St.-Hilaire and Jules Savigny. But as the complete results of the labours of É. Geoffroy St.-Hilaire regarding the Reptiles did not appear until almost the close of the second decade of the present century, the literature that appeared before the French work was published has first to be considered.

In the eighth volume of Daudin's 'Reptiles'<sup>2</sup> the two species of the genus *Varanus* were differentiated; the purely terrestrial form, which had apparently not been distinguished from the aquatic *V. niloticus*, was indicated as *Tupinambis griseus* = *V. griseus*.

Merrem<sup>3</sup>, whose Syst. Amph. was published in 1820, had access to the first part of the 'Atlas' illustrating the results of Geoffroy's and Savigny's work in Egypt. He selected the lizard figured on pl. v. figs. 3 and 4, illustrating the reptiles, as the type of one of his sections of the genus *Agama* and named it *Agama mutabilis*.

Lichtenstein<sup>4</sup>, in 1823, made the following additions to the fauna of Egypt proper and to that of the upper part of the Nile Valley:—

<i>Testudo græca</i> , Linn.	= <i>Testudo leithii</i> , Gthr.
<i>Ascalabotes sthenodactylus</i> , Licht.	= <i>Stenodactylus elegans</i> , Fitz.
<i>Uromastix ocellatus</i> , Licht.	
<i>Lacerta boskiana</i> , Daud.	= <i>Acanthodactylus boskianus</i> (Daud.).
„ <i>pardalis</i> , Licht.	= „ <i>pardalis</i> (Licht.).
„ <i>grammica</i> , Licht. part.	= „ <i>scutellatus</i> (Aud.).
„ <i>guttulata</i> , Licht.	= <i>Eremias guttulata</i> (Licht.).
„ <i>rubropunctata</i> , Licht.	= „ <i>rubropunctata</i> (Licht.).
<i>Scincus quinqueteniatus</i> , Licht.	= <i>Mabuia quinqueteniata</i> (Licht.).
<i>Coluber moniliger</i> , Daud.	= <i>Psammophis sibilans</i> (Linn.).
<i>Bufo viridis</i> , Laur.	
„ <i>cinereus</i> (non Schn.).	= <i>Bufo regularis</i> , Reuss.

Besides these, *Bufo fuscus*, Laur., was stated to be present in Nubia, but it is impossible to say what species may have been meant.

Rüppell, in the beginning of 1817, visited Egypt for the first time. He landed at Alexandria and proceeded by Rosetta to Cairo and the Fayum and as far as the First Cataract. On his return to Lower Egypt, he visited Arabia Petrea (Sinaitic Peninsula)

<sup>1</sup> Daud. Hist. Rept. iv. 1803.

<sup>2</sup> Hist. Nat. des Rept. vol. viii. 1803.

<sup>3</sup> Syst. Amph. 1820.

<sup>4</sup> Doubl. Zool. Mus. Berl. 1823.

and in the autumn of the same year returned to Frankfort. On his second visit (1822) he was accompanied by Surgeon Michael Hey, and on their arrival in Egypt they turned their steps towards the Fayum, thence by way of Damietta to Lake Menzaleh, and afterwards to Alexandria, where Rüppell met Hemprich, the companion of Ehrenberg who was then in Dongola. Rüppell and his companion Hey then proceeded up the Nile to Thebes, whence they made an excursion to Kosseir. They afterwards continued their journey to the south as far as Dongola, and after a short residence there Rüppell returned to Cairo, but when the hot season had passed he rejoined his companion. He attempted, in the end of 1823, to reach Kordofan, but failed, and returned to Cairo in June 1824. Towards the latter part of that year he and his companion again set out for New Dongola. In the end of that year Rüppell with some of his attendants started for Kordofan across the desert of Simri, and on the 13th July, 1825, reached the capital. He remained seven weeks in Kordofan and returned to Cairo in the month of July. He was the first scientific traveller to visit Kordofan. He spent the first half of the year 1826 on the coast of the Gulf of Suez, and Akaba, making long excursions into the country, into the Sinaitic Peninsula, and along the coast to El Tor. He also sailed along the coast to Massowah. He returned to Europe, arriving at Leyden on the 20th Sept., 1827. In the autumn of 1830 Rüppell, accompanied by Theodore Erckel, set out again for Egypt and made another expedition, in the early part of 1831, to the Sinaitic Peninsula, where he spent some time. He then proceeded to Massowah, which he reached 17th Sept., 1831, and remained in Abyssinia until after the middle of 1833. On his way up the Red Sea he stopped at Jiddah, to study its natural history, and remained there apparently for some months. Returning to Egypt he resided at Cairo from November 1833 to the spring of 1834, when he finally returned to Europe. The results attained by Rüppell on his excursions in Egypt, including his journey to Kordofan and apparently his first visit to Massowah, were described by C. H. G. von Heyden <sup>1</sup>.

The following species were new to the fauna of the Nile Valley :—

<i>Hemidactylus granosus</i> , Heyden.	= <i>Hemidactylus turcicus</i> (Linn.).
<i>Agama arenaria</i> , Heyden.	= <i>Agama sinaita</i> , Heyden.
<i>Uromastix dispar</i> , Heyden.	= <i>Uromastix acanthinurus</i> , Bell.
<i>Varanus ocellatus</i> , Heyden.	

In 1823, when Rüppell was attempting to enter Kordofan, and Hemprich and Ehrenberg<sup>2</sup> were conducting their natural-history researches at Damietta, Wilkinson and Burton (afterwards Haliburton) were exploring Lower Egypt from an archaeological standpoint, but at the same time were not wholly ignoring its fauna, as is evinced by their donations to the British Museum.

<sup>1</sup> Atlas nördl. Afr., Rüppell (1827).

<sup>2</sup> Reisen durch Nord-Afr. (Reisen in Aegypten, Libyen, Nubien u. Dongala, 1828).

Giovanni Battista Brocchi<sup>1</sup>, a celebrated Italian mineralogist, was appointed by Mohammed Ali to be a member of the Scientific Commission attached to the Expedition which was dispatched, in 1823, for the conquest of Sennaar. He died at Khartum in 1826. In the Atlas to his posthumous work two lizards and two snakes are figured from that part of the Nile Valley. One of the lizards is *Scincus officinalis*, while the other figure suggests the *Agama* described by Peters from Sennaar, in 1862, as *Agama hartmanni*. One of the snakes represented is an *Eryx*, possibly *E. muelleri*, Blgr., but it is impossible to say what species the other figure depicts.

Considerable uncertainty exists regarding the date of publication of the contributions of É. Geoff. St.-Hilaire, Is. Geoff. St.-Hilaire, and Victor Audouin to the first volume of the Natural History of the 'Description de l'Égypte' which bears the date 1809. As the second of these distinguished men was born in Paris, in 1805, the fallacy of the date is self-evident; and as he was only made assistant to his father when he was nineteen years of age, the discrepancy between the date the volume bears and its possible actual date of publication is still further emphasized. A consideration of the literature of the period and a study of the evidence derived from the book itself by the passing references it contains to the literature of the time sanction the conclusion that Is. Geoffroy's portion was not completed before 1827 and that Audouin's part was not finished before 1829.

É. Geoffroy's researches, and likewise Savigny's, were first carried on in the Delta, but were afterwards continued in Upper Egypt; no details, however, are vouchsafed regarding the exact localities in which the specimens were found, except in two instances in which the two serpents are designated after the districts in which they were obtained.

The following are the additions that were made to the Reptilians and Batrachians of Egypt by É. Geoffroy St.-Hilaire and his colleagues:—

<i>Trapelus savignyi</i> , Aud., var.	= <i>Stenodactylus petrii</i> , Anders.
<i>Gecko annularis</i> , Is. Geoffr. St.-Hil.	= <i>Tarentola annularis</i> (Is. Geoffr. St.-Hil.).
<i>L'Agame variable ou Le Changeant</i> .	= <i>Agama mutabilis</i> , Merrem.
<i>Agama rudrata</i> (non Olivier), Aud.	= „ <i>pallida</i> , Reuss.
„ <i>agilis</i> (non Olivier), Aud.	= „ <i>flavimaculata</i> , Rüppell.
<i>Scincus schneideri</i> , Daud.	= <i>Eumeces schneideri</i> (Daud.).
„ <i>sepsoides</i> , Aud.	= <i>Chalcides sepsoides</i> (Aud.).
<i>L'Éryx de la Thébaïde</i> .	= <i>Eryx thebaicus</i> , Reuss.
<i>Coulouvre</i> , Suppl. pl. iv. fig. 4 (1813).	= <i>Zamenis dahlia</i> (Fitz.).
<i>Coluber florulentus</i> , Is. Geoffr. St.-Hil.	= „ <i>florulentus</i> (Is. Geoffr. St.-Hil.).
<i>Coulouvre</i> , Suppl. pl. iv. fig. 6 (1813).	= „ <i>ravergieri</i> (Ménétr.), var. <i>nummifer</i> ,
<i>La Coulouvre aux raies parallèles</i> , pl. viii. figs. 1 & 1'.	= <i>diadema</i> (Schl.), [Reuss.]

<sup>1</sup> Giornale delle Osservaz. fatte ne' Viaggi in Egitto &c. (1841-43) (posthumous).

<i>Coulouvre</i> , Suppl. pl. iv. fig. 2 (1813).	= <i>Tarbophis savignyi</i> , Blgr.
„ Suppl. pl. v. fig. 1 (1812).	= „ <i>obtus</i> (Reuss).
<i>Coluber insignitus</i> , Is. Geoffr. St.-Hil.	= <i>Cœlopeltis monspessulana</i> (Hermann).
„ „ pl. vii. fig. 6.	= „ <i>moilensis</i> (Reuss).
„ <i>cucullatus</i> , Is. Geoffr. St.-Hil.	= <i>Macroprotodon cucullatus</i> (Is. Geoffr. St.-Hil.).
<i>Vipère Haje</i> , part., pl. vii. fig. 3.	= <i>Naja nigricollis</i> , Reinh.
<i>Scythale pyramidum</i> , Is. Geoffr. St.-Hil.	= <i>Echis carinatus</i> (Schn.).
<i>Rana esculenta</i> (non Linn.), Aud.	= <i>Rana mascareniensis</i> , Dum. & Bibr.
<i>Hyla savignyi</i> , Aud.	= <i>Hyla arborea</i> , var. <i>savignyi</i> , Blgr.

About 1829, Alexandre Lefèvre<sup>1</sup>, a zealous entomologist, one of the many Europeans who entered the service of Mohammed Ali, discovered the larva of a Triton in the oasis of Baharieh.

In 1834, Reuss<sup>2</sup> described many of the reptiles that had been collected by Rüppell, and gave names to other species figured in the 'Description de l'Égypte.'

Rüppell<sup>3</sup>, between 1835 and 1840, recorded *Testudo sulcata* = *T. calcarata* from Dongola, Sennaar, and Kordofan.

In 1836, Duméril and Bibron<sup>4</sup> mentioned that the Paris Museum possessed specimens of *Gymnodactylus scaber*, Heyden, from Egypt, collected by Rüppell.

In the following year, the same authors<sup>5</sup> recorded the presence in Egypt of *Uromastix ornatus*, Heyden, the specimens having been obtained by M. Botta, a travelling naturalist in the employment of the Paris Museum<sup>6</sup>. The type of this species is erroneously stated by Duméril and Bibron to have been found in North Africa, whereas Heyden was most explicit in mentioning that it was collected by Rüppell at Mohila, on the Arabian coast of the Red Sea.

J. E. Gray<sup>7</sup>, in 1842, described as new a number of Egyptian reptiles presented to the British Museum; but all of them were referable to species already known.

The only species of *Glauconia* as yet known to exist between the Mediterranean and Wádi Halfa was described by Duméril and Bibron, in 1844<sup>8</sup>, from a specimen found at Cairo, preserved in the Strassburg Museum, and named by them *Stenostoma cairi*. In the same volume, they also pointed out the presence of *Python seba* (Gmel.) in the region of the White Nile, where it was obtained by M. d'Arnaud<sup>9</sup>.

<sup>1</sup> Gervais, Ann. Sc. Nat. (2) 1836, p. 312. Lefèvre died at Sennaar in the commencement of 1840.

<sup>2</sup> Mus. Seuck. i. 1834.

<sup>3</sup> Neue Wirbelth. von Abyss. 1835-40.

<sup>4</sup> Erpét. Gén. iii. 1836.

<sup>5</sup> Op. cit. iv. 1837.

<sup>6</sup> It is quite possible that Duméril and Bibron may have used the term Egypt in a loose sense, and may have included the Sinaitic Peninsula, as it formed in their day a part of political Egypt.

<sup>7</sup> Zool. Misc., March 1842.

<sup>8</sup> Erpét. Gén. vi. 1844.

<sup>9</sup> M. d'Arnaud, in 1838, was sent by Mohammed Ali to analyse the auriferous lands at Fazakol, and, in 1840, he went as a member of a scientific expedition to the Blue Nile, under the leadership of M. Selim, a Turkish officer of Marine. He made extensive collections of natural history objects, but on his return journey they were all lost at the Fourth Cataract, with the exception of that portion of them that had been forwarded by land. (Bull. Soc. Geogr.)



J. E. Gray<sup>1</sup>, in 1845, recorded *Agama colonorum* (non Daud.), Gray, = *A. spinosa*, Gray, from Egypt, the specimens having been collected by Wilkinson and Burton.

In the same year as Gray's Catalogue appeared, Rüppell published his Catalogue of the Reptiles in the Senckenbergian Museum at Frankfort<sup>2</sup>, the species enumerated having been chiefly collected by himself. Among the vipers we have the first instance of the presence of *Bitis arietans* in Kordofan.

A. Duméril<sup>3</sup> (1851) recorded the presence of *Sternothærus adansonii* (Schweigger) and *Cryptopus senegalensis* = *Cyclanorbis senegalensis* (D. & B.) in the White Nile, where they were collected by d'Arnaud; and the existence of *Chamæleon calyptratus*, A. Dum., in the region of the Nile, whence it had been obtained by Botta.

*Rhachiodon abyssinicus*, D. & B., = *Dasypeltis scabra* (Linn.), was mentioned for the first time from the Nile Valley in 1854<sup>4</sup>. The specimen was found by d'Arnaud on his expedition to the White Nile.

Ulrich Jasper Seetzen<sup>5</sup>, the distinguished traveller, visited Lower Egypt and the Fayum, in 1809. He had apparently interested himself in the Reptilian and Batrachian fauna of the country, as the posthumous account of his travels that appeared, in 1855, mentions about ten species of snakes and two batrachians, chiefly under their native names, but unaccompanied by any exact description.

Dr. Günther<sup>6</sup>, in 1858, enumerated seven species of snakes from Egypt, collected by Wilkinson and Burton, and a specimen of *Psammophis schokari*, Forskål, obtained by A. Lefebvre, but which he did not recognize as distinct from *P. sibilans* (Linn.). He likewise, in the same year<sup>7</sup>, recorded the presence of a new genus (*Hemisis*, Gthr.) of the Engystomatidæ in Kordofan—the *H. sudanense* (Steindach.).

In 1860, Jan<sup>8</sup> figured a *Glaucônia* from Sennaar under the name of *Stenostoma macrorhynchum* = *G. macrorhynchus* (Jan).

Peters<sup>9</sup> published, in 1862, a list of reptiles collected between Wádí Halfa and Sennaar by Baron de Barnim and Dr. Hartmann and some others from "Egypt." The following were new to the Nile Valley:—

<i>Pelomedusa gehafie</i> , Rüppell.	= <i>Pelomedusa galeata</i> (Schoefff).
? <i>Agama colonorum</i> , Daud.	
<i>Agama savignyi</i> , non D. & B.	= <i>Agama hartmanni</i> , Peters.
<i>Gerrhosaurus flavigularis</i> , Wieg.	
<i>Lytrochinchus diadema</i> , Dum. & Bibr.	
<i>Crotaphopeltis rufescens</i> , Boie.	= <i>Leptodira hotamboeia</i> (Laur.).
<i>Heterophis resimus</i> , Peters.	= <i>Causus resimus</i> (Peters).
<i>Cystognathus senegalensis</i> , D. & B.	= <i>Cassina senegalensis</i> (D. & B.).

<sup>1</sup> Cat. Liz. B.M. 1845.

<sup>2</sup> Mus. Senck. iii. 1845.

<sup>3</sup> Cat. Rept. Paris Mus. 1851.

<sup>4</sup> Dum. & Bibr. vii. pl. i.

<sup>5</sup> Reisen durch Syrien, Pal. &c., 3 vols., 1855.

<sup>6</sup> Cat. Col. Snakes B. M.

<sup>7</sup> Cat. Batr. Sal. B. M. 1858, p. 47.

<sup>8</sup> Icon. Gén. 1 livr. Dec. 1860, pls. v. & vi. fig. 12; Arch. Zool., Anat. e Fisiol. i. 1862, p. 190.

<sup>9</sup> Mon. Berl. Ak. 1862, p. 271.

Strauch<sup>1</sup>, in his account of the Reptilian fauna of Algeria, recorded *Seps chalcides*, Bonap.=*Chalcides tridactylus*, Laur., as an Egyptian lizard, but the evidence as to the existence of this species in Egypt is as yet inconclusive.

In 1863, Jan<sup>2</sup> indicated a snake as *Coronella austriaca*, Laur., var. *egyptiaca*, thus implying that it came from Egypt. This is, however, so extremely improbable that it must be attributed to an error of locality.

In the same year, Peters<sup>3</sup> recorded the presence of *Tropidonotus tessellatus* (Laur.) in Egypt.

Dr. Steindachner, in 1867<sup>4</sup>, mentioned the occurrence of a frog in Kordofan, which he named *Pyxicephalus cordofanus*=*Rana cordofana* (Steindach.).

The late Professor Cope described, in 1868<sup>5</sup>, a new chameleon from Nubia, which he named *C. basiliscus*. An example of this species from Egypt had been presented to the British Museum by James Burton between 1824-30, but Dr. Gray had regarded it as *C. vulgaris*.

Peters, in 1869<sup>6</sup>, recognized that the Agamoid lizard from Dongola, which he had at first identified with *Agama savignyi*, D. & B., was a new species, and named it *A. hartmanni*. In the same year, he described a small gecko from Sennaar, under the name *Gymnodactylus steudneri*, Peters,=*Tropicolotes steudneri* (Peters).

The viper *V. lebetina* was stated by Strauch in 1869<sup>7</sup> to be represented in the Berlin Museum by an Egyptian specimen; but by the courtesy of Dr. Tornier I am enabled to state that no such example is present at Berlin, where there is, however, a specimen labelled from North Africa.

Gray<sup>8</sup>, in his short account of the few reptiles collected on Petherick's journey, described a chameleon, which he named *C. lævigatus*, Gray,=*C. senegalensis*, Daud., from 805 kilom. to the south of Khartum.

Strauch<sup>9</sup>, in his monograph of the snakes of Russia, mentions *Coronella austriaca*, Laur., as an Egyptian snake on the erroneous statement made by Jan; and also *Coluber quadrilineatus*, Pallas=*C. situla*, Linn., on the authority of the 'List of Animals living in the Zoological Gardens, London'<sup>10</sup>. His retention of *Vipera ammodytes* (Linn.) as a member of the fauna of Egypt rests solely on a statement by Pliny quoted by Solinus, who lived about A.D. 238.

<sup>1</sup> Mém. Ac. St. Pétersb. vii. iv. no. 7 (1862).

<sup>2</sup> Arch. Zool., Anat. e Fisiol. ii. 1863, fasc. ii. p. 238.

<sup>3</sup> Mon. Berl. Ak. 1863.

<sup>4</sup> Reise Freg. Novara, Amph. 1867, p. 8.

<sup>5</sup> Proc. Ac. Nat. Philad. 1868, p. 316.

<sup>6</sup> Mon. Berl. Ak. 1869.

<sup>7</sup> Mém. Ac. St. Pétersb. vii. xiv. 1869, no. 6.

<sup>8</sup> Travels in Central Africa, &c., 1869, Append. vol. ii.

<sup>9</sup> Mém. Ac. St. Pétersb. vii. xxi. no. 4 (1873).

<sup>10</sup> 4th ed. 1866, p. 991.

A few well-known species of Reptiles, and one Batrachian, were collected, in 1874, by Rohlf's and Acherson on their Expedition to the Libyan desert, and were enumerated by Peters<sup>1</sup> in the same year.

Gasco, in the account of his journey to Egypt in company of his friend Panceri<sup>2</sup>, gave a list of the Reptiles they collected, amounting in all to 48 species. He recorded the presence of *Gymnodactylus flavipunctatus* (Rüppell)=*Pristurus flavipunctatus*, Rüppell, in the Sudan, and added *Dasypeltis scabra* (Linn.) to the fauna of Egypt proper. He mentioned that he had obtained *Tropidosaurus algira*, Fitz.,=*Psammomachus algirus* (Linn.), in the neighbourhood of Alexandria, and also *Seps chalcides*, Bonap.,=*Chalcides tridactylus*, Laur., in the vicinity of the same city. The presence, however, of these two species in the littoral of Egypt has yet to be verified by a competent herpetologist.

C. B. Klunzinger<sup>3</sup>, in 1878, published a list of a few reptiles from Kosseir collected during his residence at that town, where he found that widely-distributed gecko *Hemidactylus flaviviridis*, Heyden.

The presence of a Salamander in the neighbourhood of Alexandria was pointed out in 1882, by Mr. G. A. Boulenger<sup>4</sup> on the authority of M. Lataste, who received some larvæ from the collection of the late M. Letourneux, said to have been obtained in the foregoing locality.

The late Dr. F. Müller<sup>5</sup>, of Basel, recorded, in 1882, the presence of *Rana esculenta*, Linn., in Egypt.

The small snake *Oligodon melanocephalus* (Jan), found in Syria and in the Sinaitic Peninsula, was received, in 1885, from Cairo by Dr. F. Müller of Basel<sup>6</sup>.

<sup>1</sup> Sitzungsber. Ges. naturf. Freunde, 1874, p. 66. As so little is known of the Libyan desert, and as the species collected by Rohlf's and Acherson serve to throw some light on the character of its fauna, they are here enumerated, with the localities in which they were found, and to them I have added *Cœlopeltis monspessulana* (Hermann), incidentally mentioned by Rohlf's in his work entitled 'Drei Monate in der libyschen Wüste,' p. 169:—

<i>Stenodactylus guttatus</i> , Cuv.	Desert, Marak.	= <i>Stenodactylus elegans</i> (Fitz.).
<i>Agama sinaita</i> , Heyden.	Ain-Amur, Khargeh.	= ? <i>Agama sinaita</i> , Heyden.
<i>Acanthodactylus savignyi</i> , D. & B.	Desert between Farafreh and Dakhel.	} = ? <i>Acanthodactylus pardalis</i> (Licht.).
<i>Acanthodactylus boskianus</i> (Daud.).	Ditto.	
<i>Monitor (Psammosaurus) griseus</i> (Daud.).	Dakhel.	= <i>Varanus griseus</i> (Daud.).
<i>Scincus officinalis</i> , Laur.	Dakhel.	
<i>Gongylus ocellatus</i> , Forsk.	Khargeh.	= <i>Chalcides ocellatus</i> (Forsk.).
<i>Cœlopeltis insignitus</i> , Regenfeld.		= <i>Cœlopeltis monspessulona</i> (Herm.).
<i>Vipera cornuta</i> , L.	Dakhel.	= <i>Cerastes cornutus</i> (Hasselq. & Linn.).
<i>Bufo viridis</i> , Laur.	"	

<sup>2</sup> Viaggio in Egitto, 1876, pt. ii.

<sup>3</sup> Zeitsch. Ges. Erdk. Berl. xiii. 1878.

<sup>4</sup> Verh. nat. Ges. Basel, vii. 1882, p. 129.

<sup>5</sup> Cat. Batr. Grad. B. M. 1882, p. 106.

<sup>6</sup> Verh. nat. Ges. Basel, vii. 1885, p. 678.

Mr. Boulenger, in 1887<sup>1</sup>, mentioned incidentally that Professor Strauch had informed him that *Scincus fasciatus*=*Scincopus fasciatus*, Peters, occurred at Khartum.

Strauch<sup>2</sup>, in his memoir of the Geckonidæ, described a new genus from Egypt which he named *Bunopus*, and designated the species *B. blanfordi*.

Lataste, in 1887, recognized a new genus of Elapine snake in a specimen that had been forwarded to him from Cairo by Dr. Walter Innes, who had purchased it from a snake-catcher, along with one or two other examples of the same serpent. This new genus he named *Walterinnesia* after its discoverer, and called the species *ægyptia* on the assumption that it was an Egyptian snake.

Mr. Boulenger, in 1892<sup>3</sup>, described a new snake from Sennaar which had been regarded by Müller, of Basel, as a variety of *Eryx jaculus* (Hasselq. & Linn.), and named it *Gongylophis muelleri*, Blgr.,=*Eryx muelleri*, Blgr.

The same author<sup>4</sup> recorded *Zamenis rhodorhachis*, Jan, as an Egyptian species, one of the specimens in the British Museum having been obtained from Egypt so long ago as Wilkinson's day. In the same volume in which the foregoing species appeared, *Lytrochynchus diadema* (Dum. & Bibr.) also occurs as a snake found in Lower Egypt, the specimens having been obtained by me at Gizeh and Abu Roash.

In 1893<sup>5</sup>, I described a species of *Zamenis* from Lower Egypt under the name of *Z. rogersi*, and, on the same occasion, indicated a new species of toad, *Bufo pentoni*, from the Suakin district.

The second report on the additions to the collection of lizards in the British Museum by Mr. Boulenger was published in 1894<sup>6</sup>. In it one species new to the fauna of the Nile Valley in Lower Egypt is mentioned, viz. *Tropicolotes tripolitanus*, Peters, the specimens recorded having been found by me at Gizeh. Another species new to the fauna of North-east Africa is also recorded, viz. *Chalcides delislii*, Lataste, which I found to be common at Suakin.

In a preliminary list of the Reptiles and Batrachians of Egypt published in 1896<sup>7</sup>, the following lizards were added to the fauna of Suakin, viz. *Tarentola ephippiata*, O'Shaughn., *Latastia longicaudata* (Reuss), *Eremias mucronata* (Blanf.), and *Chamaeleon basiliscus*, Cope; whilst the presence of the last named in the Delta of the Nile Valley, along with *C. vulgaris* (Linn.), was established. In the same list, *Testudo ibera*, Pallas, was indicated as being possibly present in the Sudan.

<sup>1</sup> Cat. Jéz. B. M. iii. 1887, p. 390.

<sup>2</sup> Ann. & Mag. N. H. (6) ix. 1892, p. 74.

<sup>3</sup> Ann. & Mag. N. H. (6) xii. Dec. 1893.

<sup>4</sup> Herpet. Arabia & Egypt, 1896.

<sup>5</sup> Mém. Ac. St. Pétersb. vii. xxxv. no. 2 (1887).

<sup>6</sup> Cat. Snakes B. M. i. 1893.

<sup>7</sup> Proc. Zool. Soc. 1894.



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By an unfortunate oversight I omitted to state, in the Preface, that all the Plates of this Volume have been printed by Messrs. Mintern Brothers. The excellence of their work is attested by the Plates themselves.

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THE  
REPTILES OF EGYPT.

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REPTILIA.  
EMYDOSAURIA.  
CROCODILIDÆ.  
CROCODILUS.

*Crocodilus, part.*, Laur. Syn. Rept. 1768, p. 53.

THE crocodile of the Nile<sup>1</sup> has formed the subject of elaborate memoirs by E. Geoffroy St.-Hilaire<sup>2</sup> and Cuvier<sup>3</sup>; but as the former authority believed in the existence of five species of crocodiles in the Nile, it is necessary to examine the evidence he adduced in support of this view.

<sup>1</sup> The Nile crocodile was described, so long ago as 1699, by Oligerus Jacobæus, as *Crocodilus niloticus* (vide Mus. Reg. Hfn. 1699, pars prima, p. 8, tab. viii. fig. vi.). Seba (Thes. i., 1734) devoted three plates to crocodiles, and on plate 105 figured two crocodiles, viz. figs. 3 & 4. The first of these he named *Crocodilus aquaticus, ceilonicus*; mas.; and the second *Crocodilus ceilonicus, superius*; fœmina. Laurenti (Syn. Rept. 1768, p. 53) quotes these two figures as illustrating a species which he called *Crocodylus niloticus*, and closes his description of it with the words "Habitat in India orientali, et Ægypto." The characters assigned by Laurenti to this crocodile are so general as to be equally applicable to *C. palustris* and *C. porosus*, doubtless for the cogent reason that he regarded the crocodiles of Ceylon and of the Nile as specifically identical. I propose to follow Mr. Boulenger, whose labours mark an epoch in the history of herpetology, and to retain *C. niloticus* for the crocodile of the Nile, as it has priority to Cuvier's term *C. vulgaris* and is in every way more definite and appropriate.

<sup>2</sup> Ann. Mus. ii. 1803, p. 37, pl. xxxvii. fig. 2; *id. op.* x. 1807, p. 82, pl. iii. figs. 1-4; Descr. de l'Égypte, Hist. Nat. i. (? 1827) p. 185, pl. ii.

<sup>3</sup> Ann. Mus. x. 1807, p. 40, pl. i. figs. 5 & 12, pl. ii. fig. 7; Oss. Foss. iv. 1812, pt. v. p. 33.

Among the many classical authors who have described the crocodile of the Nile, Herodotus<sup>1</sup> holds the front rank. He informs us that it was known to the ancient Egyptians as *Champsæ*, a name which survives in the Coptish *amsah*, or, with the masculine article P prefixed, P-amsah<sup>2</sup>, and in the Arabic *تمساح*=Timsáh, all of which have a common origin in *emsuh*, signifying "from the egg."

Strabo<sup>3</sup> relates that 100 stadia above the Labyrinth the traveller comes to the city of Arsinoë or Crocodilopolis, so called because the crocodile was held in high veneration by the inhabitants, who kept one alive in a lake and called it *σοῦχος*. This term, as opposed to *χάμψα*, was supposed by E. Geoffroy St.-Hilaire to signify the existence of two species in the Nile; and so firmly convinced was he of their existence, that he described them under the names *C. vulgaris* and *C. suchus*.

Strabo has given a graphic account of his visit to the tame crocodile of the nome of Arsinoë. He was accompanied by his host, who went provided with some cake, roast beef, and wine; and on reaching the lake they found the crocodile lying on the bank, and so docile was it, that the attendant priests opened its mouth, into which they placed the cake and meat, and afterwards poured the wine. Geoffroy held that crocodiles manifesting this mild disposition were specifically distinct from another species distinguished by its savage nature, and that the sacred crocodiles were always selected from the former. He quoted, in support of this view, a statement made by Damascius<sup>4</sup>, in his life of Isidore, to the effect that "the suchis is righteous or just; this is a name of a species of crocodile. It hurts no animal."

Cuvier has pointed out that neither Herodotus, Aristotle, Deodorus, Pliny, nor Ælian had any idea of two different kinds of crocodile existing in the Nile, and that the mildness of character of the sacred individuals, as pointed out by Aristotle and other classical authors, only illustrates the fact that no animal is so savage that it cannot be tamed by man, if his treatment of it is gentle, and if he supplies it with abundance of food. The destructive *C. palustris* of Indian rivers when similarly treated becomes so tame that it can be fed by hand, and so trustful of man that the priests at the hot springs of Pir Manglo, 6 or 7 miles from Karachi, even paint its forehead<sup>5</sup>.

A careful consideration of all that has been handed down by the ancients regarding

<sup>1</sup> Herod. ii. 69. Herodotus also states that *κροκόδειλος* was a word of great antiquity and of Ionian origin. It was applied by Ionians in Egypt to the crocodile because in this animal they saw a resemblance to the large lizards of their own hedgerows.

Etymologists hold that *κροκόδειλος* is a compound word. They are at one that the second element *δελος* signifies "fearful or timid": but some hold that the first portion of the word is *κρόκος*, saffron; while others maintain that it is *κρόκη*, the sea-shore or a bank. Gesner favoured the first explanation, but Bochart regarded both derivations as ridiculous.

<sup>2</sup> Jablonski, *Pantheon Ægyptorum*. Frankfurt, 1750. 8vo. Pt. iii. p. 70.

<sup>3</sup> Geogr. Bk. xvii. vol. v. p. 411. Paris, 1819. 4to.

<sup>4</sup> Photii Bibliotheca, ed. Hoeschellii, 1653, p. 1048.

<sup>5</sup> A. L. Adams, 'Wanderings of a Naturalist in India,' 1867, p. 43.

the sacred crocodile of the Nile led Cuvier to dissent from Geoffroy St.-Hilaire's opinion that the term *suchus* meant a distinct species, and to conclude that it was merely the name applied to individuals of the Nile crocodile set apart as sacred, and, as pointed out by Champollion<sup>1</sup> the younger, *σοῦχος* is the very name of the crocodile God, Sebak or Souk.

Geoffroy St.-Hilaire, during his twenty-three days' residence at Thebes, now close on a century ago, chiefly occupied himself in searching for and preserving as many mummies of animals as he could find, and skeletons of those species still living in Egypt, his object being, by a comparison of the mummified and recent skeletons, to throw, if possible, some light on a question much debated in his day, viz. whether species degenerate, or acquire characters in perpetuity, in a country like Egypt that has been the subject of great physical changes; but he does not appear to have arrived at any definite results on this interesting question taken as a whole.

The skull of a mummified crocodile obtained by him at Thebes appeared, however, to him to differ from the skull of a recent Nile crocodile in being narrower and more elongate, in the cheek-bones being proportionally further apart, and in the openings of the orbital cavities being much wider. These differences he considered indicated a distinct species; and he states that a fisherman at Luxor told him that there were three species of crocodile in the Nile, viz. one coloured green, another brownish red, and a third black. The novelty, however, of his surroundings in the Thebaid and the fascination of its monuments so interrupted Geoffroy's zoological work, that he was unable, he tells us, to verify this statement made by the fisherman; but every one who has had to deal with ignorant fishermen knows how little, if any, reliance can be placed on their judgment in such matters. Geoffroy says that he would not have ventured to establish the species merely on a mummy's skull, as he was aware that the difference he observed might ultimately prove to be individual or characteristic of a particular age. He had, however, another skull exactly like that of the mummy, and he had, moreover, observed another similarly shaped skull in what he calls "our collections."

Geoffroy was well aware of the remarkable changes that take place in the form of the skulls of crocodiles as they increase in age, and was thus quite alive to the danger attending the selection of the relative length of the skull to the body as a specific distinction, but at the same time he does not appear to have recognized them in their full extent. In the semi-adult condition the lower jaw partakes of the elongated form of the anterior part of the skull, but in mature age it assumes a massive character in keeping with the rest of the skull. In the skull of the type of *C. suchus*, which only measured 95 millim. in length, the lower jaw was long and slender, in keeping with its youth. Geoffroy, however, held that this supposed species did not exceed 5 ft.

<sup>1</sup> Panthéon Égyptien. Paris, 1823-5. 4to. No. 22.

in length, and he believed that the mildness of disposition attributed to the *suchus* by Damascius<sup>1</sup> was really the outcome of its weak jaws.

Geoffroy makes no mention of the differences in the form of the head of the two sexes, except in one passage, in which he says that his guides assured him that they could distinguish the sexes by their heads, and even by the impress left by them on the sands, as the head of the male was heavier and broader than that of the female. These characters are well marked, and not only has the male crocodile a heavier and broader head as a whole than the female, but the snout also is broader and less elongate.

The characters which he supposed distinguished *C. suchus* from *C. niloticus* were, that the former had its nasal bones forming a gentle eminence throughout their length, that they were proportionally narrower than in *C. niloticus*, that a groove lay along their external borders, and that the upper surface of the head was smooth, while in *C. niloticus* it was rugose. All of these characters, however, when a large series of skulls is examined, are to be explained either by sex, difference of age, or individual peculiarity. He recognized that, in the form of its scales generally, *C. suchus* was closely allied to *C. niloticus*, and that the colours in the two were much the same, but he held that in *C. suchus* the nuchals were always longer than broad. The nuchals, however, of the crocodile of the Nile vary considerably in their length, breadth, and distribution, so that no importance can be attached to the trivial variation indicated by Geoffroy. Another feature in which Geoffroy says *C. suchus* differed from *C. niloticus* was the greater length of its tail. In connection with this it is interesting to find that John Antes<sup>2</sup>, who was resident in Egypt from 1770 to 1782, wrote as follows:—"I observed two sorts of crocodiles, though I question whether the difference did not consist in the sex only. The one is, in proportion of its thickness, rather longer than the other, but it consists more in the tail."<sup>3</sup> Geoffroy, however, thought that John Antes's observation favoured his view as to the presence of two species of crocodiles.

Cuvier regarded Geoffroy's *C. suchus* as possibly a variety of the Nile crocodile, on the ground that its head was more flattened and more elongate than that of *C. niloticus*, and because he had two entire individuals the heads of which presented the same characters. Besides the differences in the form of the head, the specimens referred to the variety were also said by Cuvier to be distinguished by their colours. On these grounds, and from the circumstance that Geoffroy had been told by the fisherman of the

<sup>1</sup> Damascius lived in the 6th century, long after the cult of the crocodile had become extinct, so that anything he has to say on the subject was derived from tradition, and, moreover, he was ignorant and credulous.

<sup>2</sup> Observ. on the Manners and Customs of the Egyptians (1800, 4to), p. 83.

<sup>3</sup> He further remarks: "of this sort were all those which I have seen in the museums of Florence, London, and some other towns in Europe."



Thebaïd that there were more than one species of crocodile in the Nile, Cuvier held that, if not a species, at least it was possibly a variety; but he hesitated to give a decided opinion, because before doing so he wished to follow it in its different ages. There is no evidence, however, that the sexes of the specimens referred to the variety had been determined; and as Cuvier makes no mention of the differences in the shape of the head of the male and female crocodile, it is possible, nay probable, that the specimens with the narrower and more elongated heads were females. At the same time, a variety of the common crocodile may exist, but no material that has as yet come under my observation seems to sanction such a supposition. Sir J. G. Wilkinson<sup>1</sup>, on the other hand, held that there were two species, but the specimens presented by him to the British Museum certainly represent only one. The information he recorded regarding them is so meagre as to be worthless in a question of this kind. He says, "though the scales serve to indicate the two species known in the Nile, they differ very little in their position; and the black and green colour of the two crocodiles is a more evident distinction."

Sir Samuel Baker<sup>2</sup> is also very explicit regarding the existence of two kinds of crocodiles. He says: "I have noticed two species of crocodiles throughout all the rivers of Abyssinia and in the White Nile. One of these is of a dark brown colour, and much shorter and thicker in proportion than the other, which grows to an immense length, and is generally of a pale greenish yellow. The Arabs assert that the dark-coloured thick-bodied species is more dreaded than the other." Unfortunately neither Wilkinson nor Baker were trained naturalists, so that their opinion on this question does not carry much weight, and, moreover, the bare statement that two exist throws no light on the question whether *C. suchus*, Geoffroy, is in reality a species.

Subsequently Geoffroy<sup>3</sup> figured the skull of the type of *C. suchus*, natural size. The drawing represents a skull 95 millim. in length. A crocodile in the British Museum, having a skull of similar dimensions, has a total length from the tip of the snout to the extremity of the tail of 678 millim.; so that the type of *C. suchus* was probably about the same size, for, as pointed out by Geoffroy, the length of a crocodile skull is  $\frac{1}{7}$  of the total length of the animal. At such an early age it is impossible to determine the sex of a crocodile by the characters of the cranium; and as the type was a mummy, we are in complete ignorance on this point.

We obtain some further information regarding the materials which served Geoffroy St.-Hilaire for the establishment of the species in the account given of it in the 'Description de l'Égypte,' which he tells us was written 20 years after his memoir had appeared in the 'Annales du Muséum,' published in 1807. In the former work

<sup>1</sup> Rawlinson's Herod. ii. p. 115; Genl. View of Egypt, 1835, p. 225, note; The Ancient Egyptians, ii. 1878, p. 133.

<sup>2</sup> The Nile Tributaries of Abyssinia, 1867, p. 96.

<sup>3</sup> Ann. Mus. x. 1807, pl. iii. figs. 1 to 4.

we are informed that a specimen in the Paris Museum measured 1 m. 280 millim. long, and that it had been brought by Adanson from Senegal, and that it bore in his handwriting "*Crocodile du vert*," and that a second specimen 1 m. 190 millim. long also existed in the same museum. This specimen was undoubtedly from the Nile, and had been presented to the Paris Museum by the son of M. Thédénat-Duvant, Vice-Consul at Alexandria. The small size of the crocodiles suggests that they were young; but Geoffroy held that they were adult; and in support of this he reverts to a passage of his in the '*Annales du Muséum*' of 1807, in which he stated that he believed that *C. suchus* attained only to about five feet in length, being led to that conclusion by a skull nine inches long, which he says had its sutures nearly effaced, a condition which Geoffroy states generally takes place only in adult crocodiles and at a certain age. He quoted the passage in question, as the specimen itself was no longer at his disposal.

In the British Museum there is a mummified crocodile, about 15 feet long, from Kom Ombos, one of the seats of its worship; and the recent researches of Professor Petrie<sup>1</sup> in the Labyrinth in the Fayum have brought to light mummified crocodiles, varying from infants up to 15 feet in length; and the occurrence in other parts of Egypt of mummies of similar dimensions conclusively proves that the ancient Egyptians made no distinction between small and large crocodiles, and that all were equally sacred to them. This disposes of Geoffroy St.-Hilaire's contention that the sacred crocodile did not attain to a greater length than five feet.

With regard to the supposed obliteration of the sutures of the foregoing skull, it is important to bear in mind that the condition was abnormal, if anchylosis of the sutures was in reality present, because persistence of the sutures of both skull and skeleton throughout life is the normal condition not only among the Emydosauria, but among the Reptilia generally, and that the sutures are more markedly visible in the adult than in the young and half-grown individuals.

Professor Owen<sup>2</sup>, in 1850, figured the skull<sup>3</sup> of a mummified crocodile from Egypt, under the name of *C. suchus*, but he truly says "there is no good specific character which distinguishes them (the mummified crocodiles) from the modern crocodile of the Nile."

Professor Huxley<sup>4</sup>, in 1860, in his description of the premaxillo-maxillary suture of the Nile crocodile, pointed out that the whole suture has the form of a W, and that it runs backwards from the canine groove as far as the level of the middle of the alveolus of the second tooth behind the groove (or that of the seventh tooth), whereas in the

<sup>1</sup> Hawara, Biahmu, and Arsinoe, 1889, p. 10.

<sup>2</sup> Palæontogr. Soc. 1850, Monograph Foss. Rept. Lond. Clay, pt. ii. p. 29, pl. i. fig. 2.

<sup>3</sup> I have not succeeded in tracing the skull. It is neither in the Royal College of Surgeons Museum nor in the British Museum.

<sup>4</sup> Journ. of Proc. Linn. Soc., Zool. iv. 1860, p. 8 & 15.

mummified skull figured by Owen the suture appears only to have reached the anterior margin of the seventh tooth; and, apropos of this, Huxley asked: "Are there, then, two or more species of crocodile in Egypt, as Geoffroy St.-Hilaire supposed?" In the skull of *C. suchus* figured by the latter author the suture is asymmetrical on either side. On the left it passes backwards to the middle of the alveolus of the seventh tooth, and then forwards internally to halfway between the alveolus and the commencement of the suture in the canine groove. It then bends abruptly inwards and slightly backwards to join the suture of the right side, but before doing so, it again for a very limited space bends abruptly forwards. The last bend represents the inner fourth limb of the W, but almost aborted. On the right side, the W form of the suture is still more obscured, as it becomes reduced to a zigzag line running backwards from the canine groove to the mesial line of the maxilla, as far as on a level with the middle of the alveolus of the sixth tooth, and then inwards, as a jagged almost transverse line, to the middle of the palate, with a short angular forward bend to join its fellow of the opposite side.

In view of the modifications in the form of the premaxillo-maxillary suture that occur in the skulls of Egyptian crocodiles undoubtedly referable to *C. niloticus*, the slight differences indicated in the foregoing description of the suture in these two skulls, in the extent to which the outer limb of the W is prolonged backwards, cannot be regarded as illustrating more than variation, as in all other respects these skulls are specifically identical. The W form of the suture is always more or less present, but it is more open in some individuals than in others, and the length of the limbs of the W varies considerably.

Geoffroy believed that the proportion in which the length of a crocodile skull stood to its base served as a comparative measure that could be usefully applied in the determination of the species, but he allowed at the same time that differences were introduced depending upon the conditions of age and sex. As he was, however, under a misapprehension as to the age of the type of *C. suchus*, the figures he adduced regarding the relative proportions of the length of the skull to its basal breadth do not prove it to be distinct from *C. niloticus*.

Geoffroy allowed that the coloration, as already stated, was almost the same in the two supposed species, but that there was this difference, that *C. niloticus* was green inclining to bronze, with the black arranged in narrow bands, whereas in *C. suchus* the black was in small spots on a clear green ground. It has been impressed on me, by the study of a considerable series of crocodiles, that the general tint is subject to much variation, and that the black may either be arranged more or less in bands, distinct in some, less so in others, and even becoming broken up into small spots. The crocodile of the Nile is thus no exception to the colour-variation which prevails to so great an extent in many other reptiles, and indeed is trivial compared with what is met with in some snakes and lizards. In certain species of the former group the

colour-variation is such that groups of individuals, if judged only by their colour, would unhesitatingly be referred to distinct species. A most striking instance of this is the snake *Homorelops lacteus*, the colour-variations of which have lately been made known by Mr. Boulenger<sup>1</sup>.

When Geoffroy St.-Hilaire returned, in 1827, to the study of the crocodiles of the Nile, not only did he still regard *C. suchus* as a good species, but he went further and described three other species from the same river, besides it and *C. niloticus*.

The first of these species, *C. marginatus*, was represented by mummies and by recent specimens. He states that "Les écailles *cervicales, dorsales, pelviennes et sexuo-caudales*, ne diffèrent ni par nombre ni par la forme de ces mêmes écailles dans l'espèce précédente" (*C. niloticus*); also that "Les couleurs de cette espèce, qui séparément sont les mêmes que celles des autres crocodiles, diffèrent dans leur distribution respective. C'est le même fond vert, mais il est masqué par une si grande quantité de traits noirs, déliés et rapprochés, que cette dernière teinte domine. Les pêcheurs de Thèbes, m'ont parlé de ce *crocodile noir*; c'est ainsi qu'ils l'appellent."<sup>2</sup> Notwithstanding its close similarity to *C. niloticus* he held that it was distinguished from it by its nuchals always being more than two and not exceeding six in number, and by another character, viz.:—"Le bord jugo-temporal ne forme plus une ligne toute d'une venue, parfaitement droite, et uniformément soutenue à la hauteur de la plaque frontale; mais il est remarquable par un relief très prononcé supérieurement, beaucoup plus en arrière que par devant. En vieillissant, ces saillies deviennent des bosselures considérables. Le nom de *marginatus* m'a paru rappeler utilement ce caractère." Added to this, he considered that the way in which the colours were distributed entitled it to specific rank. He also attached some importance to the presence of 21 scales in the posterior portion of the tail, *i. e.* behind the junction of the dorsolateral ridges, as he had only met with 16 scales in that part of the tail of *C. niloticus*, and 19 in *C. suchus*.

The swellings on the side of the head, supposed to be characteristic of *C. marginatus*, are also present in skulls which cannot but be regarded as referable to *C. niloticus*. They seem to be largely brought about by age, as they are always most pronounced in adults.

Cuvier, in 1812, described a crocodile from the Senegal as *C. biscutatus*, distinguished by the presence of only two large pyramidal scales on the middle of the nape and two small ones in front. Geoffroy was uncertain whether it might not be the same species as his *C. marginatus*; but in describing the fourth species of crocodile from the Nile, which he called *C. lacunosus*, and which had also only two nuchal scales, he says, "I know of no other crocodile distinguished by this feature, unless it be the *biscutatus* of M. Cuvier." *C. lacunosus* and *C. complanatus* were founded on mummies—the former on a specimen 2 m. 496 millim. in total length, and the latter on a still larger

<sup>1</sup> Cat. Snakes B. M. iii. 1896, p. 409.

<sup>2</sup> Descr. de l'Égypte (8vo ed.), Hist. Nat. vi. 1829, p. 565.



specimen, the dimensions of which are not given. It is, however, now generally recognized that all of these supposed species are nothing more than varieties of the common crocodile of Africa.

Bory de St. Vincent <sup>1</sup> has also described the Nile crocodile under the name *C. chamses*. The crocodile described by Baikie from the Niger as *C. binuensis* <sup>2</sup>, and the one from Madagascar named by Grandidier <sup>3</sup> *C. madagascariensis*, are both unquestionably specifically identical with *C. niloticus*.

<sup>1</sup> Dict. Class. d'Hist. Nat. v. 1824, p. 105.

<sup>2</sup> Proc. Zool. Soc. 1857, p. 48.

<sup>3</sup> Ann. Sc. Nat. xv, 1872, art. 20.

## CROCODILUS NILOTICUS. (Plate I.)

1 juv. Wádí Halfa. Surgeon-Captain R. H. Penton, D.S.O.

Snout variable, broader in both sexes in the adult than in semi-adults, narrower in females than in males, short and broad in the young. Upper surface of the head more or less rugose, most so in adults, but devoid of ridges. Two to six anterior nuchal plates arranged singly or in pairs on each side of the mesial line, symmetrically or asymmetrically, thus:  $1+1=2$ ;  $2+2=4$ ;  $3+2=5$ ;  $3+3=6$ . Generally six posterior nuchals, four anterior and two posterior; but occasionally  $\frac{3}{2}, \frac{3}{2}$ , or  $\frac{4}{2}=8$ . These shields have generally a few small scales around them. Fifteen to seventeen transverse bands of plates along the back to the base of the tail, thirteen or fifteen of them being dorsal and two pelvic in position. Generally six juxtaposed plates in each transverse row on the back, with smaller separate plates external to them on the sides, but only four plates in transverse series on the pelvic region. The dorsal plates are strongly keeled, and constitute six ridges on the back and four on the pelvis. Fifty-one to sixty-one rows of scales from the first dorsal to the tip of the tail, and thirty-two to thirty-seven from the first dorsal to the commencement of the azygos caudal ridge. Sixty-seven to seventy-nine rows of scales from the largest pectoral scale to the tip of the tail. Scales on the limbs smooth or carinated; the hind limb with a broad serrated fringe along its posterior border. Hind foot broadly palmate; fore foot webbed at the base of the digits.

General colour greenish or bronze-green, more or less banded or spotted with black, more profusely in some than in others, so that the prevailing colour is brownish black, but with the green colour still distinct in the interspaces<sup>1</sup>. Under surface greenish yellow.

The premaxillo-maxillary suture W-shaped, but the degree of openness of the W and the length of its limbs variable. 18 or 19 teeth in the upper, and 15 teeth in the lower jaw.

There is considerable variation in the number and size of the nuchals generally. The lowest number of the anterior nuchals is  $1+1$ , and the highest  $3+3=6$ , but  $2+2=4$  appears to be the prevailing arrangement. Occasionally, however, there may be  $2+3$  and  $3+2$ . The posterior nuchals are juxtaposed and are generally arranged in two lines, thus  $\frac{2+2}{1+1}=6$ , the most extreme variation being  $\frac{1+1}{1+1}=4$ . However, the following formulæ also occur, viz.  $\frac{2+1}{1+1}=5$ , or  $\frac{3+1}{1+1}=6$ . In the formula  $\frac{2}{3}$ , a small plate occurs external to each side of the scales of the anterior row. They are doubtless plates that have become removed away externally. In the asymmetrical formula  $\frac{3}{2}$

<sup>1</sup> It is not known whether the sexes are distinguished by differences of colour.



CROCODYLUS NILOTICUS,  
AND SO-CALLED CROCODYLE-BIRDS,  
*Hoplopterus spinosus* and *Phasianus aegyptius*.





one of the plates of the anterior row has been suppressed. In every case a few keeled plates of varying size are arranged around the posterior nuchals, and in one instance an additional pair of plates occurs, giving rise to the formula  $\frac{4}{3}$ .

The first row of dorsal plates is generally well defined and follows the formula  $3+3$ , but instances occur in which some of the dorsal plates in this row are not developed in continuous transverse series. These plates, notwithstanding this abnormality, I have regarded as dorsal.

The statements made by travellers and other observers regarding the length of the crocodile of the Nile are most varied. In an Egyptian tale<sup>1</sup>, as old as the fourth dynasty, we learn that a crocodile seven cubits long merited the term "great" being applied to it. Herodotus, on the other hand, gives seventeen cubits as the length; whereas Ælian<sup>2</sup> affirms that during the reign of Psammetichus one had been seen 25 cubits, and another, in the time of Amasides, 26 cubits of four spans each. Abd-Allatif<sup>3</sup>, a celebrated Arab physician and traveller of Baghdad, who arrived in Egypt about 1190 A.D. and taught medicine and philosophy at Cairo for a few years, mentions that some crocodiles attained to 20 cubits; whereas Marmol<sup>4</sup>, who was in Egypt in the middle of the sixteenth century, speaks of crocodiles only 10 cubits long. Prospero Alpini<sup>5</sup>, physician to the Consul for the Venetian Republic in Egypt from 1581 to 1583, states that the crocodile attained to 30 cubits in length, but, in doing so, he was evidently repeating the exaggerated statements of the natives. Wansleben<sup>6</sup>, who was in Egypt about a century later, records that he had heard that the largest crocodile did not exceed 12 cubits. Pococke<sup>7</sup>, who visited the country in the fourth decade of the eighteenth century, mentions that he met with specimens from 15 to 20 feet long; whereas Hasselquist<sup>8</sup>, who was in Lower Egypt a few years later on, says that some eggs that had been brought to him were from a female 30 cubits in length; but as he apparently did not see the specimen, he was merely repeating what had been told him by the natives. Denon<sup>9</sup>, the French Academician, estimated the length of one he saw at Denderah to be 15 to 18 feet, whereas, at Keneh, he saw some 28 feet in length, whilst another was reported to be 40 feet long<sup>10</sup>. Sonnini<sup>11</sup>

<sup>1</sup> Egyptian Tales translated from the Papyri by Prof. F. Petrie. 1st ser. p. 12.

<sup>2</sup> De Nat. Anim. xvii. 6.

<sup>3</sup> Relation de l'Égypte, transl. by de Sacy, 1810, p. 140.

<sup>4</sup> Description de l'Afrique, 1573, lib. i. cap. 23.

<sup>5</sup> Rerum Ægypt. lib. iv. cap. 5 (Lugd. Bat. 1735, 4to), p. 218.

<sup>6</sup> The Present State of Egypt (1672-73), 1678, p. 46.

<sup>7</sup> Deser. of the East, i. (1743) p. 114.

<sup>8</sup> Iter Palæst. 1757, p. 296.

<sup>9</sup> Voy. dans la Basse et la Haute Égypte (1798-1799), 1802, i. p. 140.

<sup>10</sup> Op. cit. p. 208.

<sup>11</sup> Voyage dans la Haute et Basse Égypte, 1798, iii. p. 298.

mentions that he saw a skin at the convent of Négua<sup>dé</sup> (Nakadeh) 30 feet long and 4 broad, and that he had been informed that some individuals attained to 50 feet in length, a statement that has recently been made regarding examples of the species in the Congo<sup>1</sup>. John Antes<sup>2</sup> states that a stuffed skin taken by him to Europe and placed in a Museum at Barby (*sic*) in Saxony measured more than 16 feet, and that it was the largest he had seen in any museum. Light<sup>3</sup>, who measured one he killed at Girgeh, in 1814, found that it was about 16 feet in length, but he had, he informs us, observed larger individuals. H. Cloquet<sup>4</sup>, writing in 1818, mentions that his father, while in Egypt with the French Expedition, had observed a crocodile at Thebes 25 feet long; and Cailliaud<sup>5</sup>, the celebrated antiquarian, saw one at Denderah of the same dimensions. Wilkinson<sup>6</sup> first held that it did not exceed 18 or 19 feet, but he afterwards believed that it did not attain to 22 feet in length. James Burton<sup>7</sup> has given the measurements of two crocodiles captured at Thebes, in 1830: one 15½ and the other 16½ feet in length. A specimen from the Nehr Zerka, or blue river, in Palestine, the crocodile river of the ancients, recorded by Mr. Schumacher, in 1877, was 3 mètres long<sup>8</sup>. Mr. Boulenger<sup>9</sup> states that the largest crocodile in the British Museum measures only 4½ mètres. A skeleton of a male in the Royal College of Surgeons Museum, shot at Silsileh by the Hon. C. P. F. Berkeley (now Lord Fitzhardinge), is 4 m. 700 millim. in length. The late Mr. V. Stuart<sup>10</sup> records that he saw four crocodiles at Abu-Simbel, and that one of them must have been 18 feet long.

From these facts it will be observed that there is no record of the actual measurements of any Nile crocodile over 17 feet, and that the greater size attributed to other specimens has all been guesswork. The limit of growth, however, is quite unknown.

The Nile crocodile lays from 40 to 60 eggs, about the size of those of a goose. They are deposited in spring in the sand, where they are hatched by the heat of the sun in about a month. Geoffroy says that Herodotus was correct in stating that the mother exercises a kind of supervision over the eggs as they approach maturity; but what the nature of this supervision is we do not know, as there is but little reliable information on record regarding the habits of this animal. A freshly hatched crocodile is about

<sup>1</sup> Werner, *River Life on the Congo*, 1889, pp. 184-185.

<sup>2</sup> *Op. cit.* p. 83.

<sup>3</sup> *Travels in Egypt* (1814), 1818, p. 47.

<sup>4</sup> *Dict. des Sc. Nat.* xii. 1818, p. 10.

<sup>5</sup> *Voyage à Méroé, au Fleuve Blanc*, 1826, i. p. 293.

<sup>6</sup> *Genl. View of Egypt*, 1835, p. 225 note.

<sup>7</sup> *Brit. Mus. Add. MS.* 25,666.

<sup>8</sup> Boettger, *Ber. Senck. Ges.* 1879-80, p. 202.

<sup>9</sup> *Cat. of Chelonians &c.* 1889, p. 283.

<sup>10</sup> *Nile Gleanings*, 1879, p. 161. In museums generally, crocodiles are almost invariably mounted lying on their bellies, as if they were merely capable of a shambling gait, and could only drag their heavy bodies along the ground. Mr. Stuart, however, states that when the large individual mentioned above observed a gazelle approaching, it got to its legs, and, with slow and deliberate steps, walked along the bank, keeping his great heavy body well off the ground.

140 millim. long, the head being a little more than  $\frac{1}{6}$  of the entire length, whereas in the adult it is  $\frac{1}{4}$ . The young at once make for the water, where many of them fall a prey to *Varanus niloticus*, which also, along with *Herpestes ichneumon*, is said to destroy many of the eggs. Another reptile, *Trionyx triunguis*, has likewise been credited with this habit.

The ichneumon belongs to a genus the members of which have a decided partiality for eggs, but as it frequents, as a rule, situations affording it the cover of reeds and long grass—that is, localities in which crocodiles would not deposit their eggs—its powers of destruction have been probably exaggerated; but the belief in them is an old story, old as the days of Herodotus. Diodorus Siculus<sup>1</sup> says that during his day an infinite multitude of crocodiles existed in the Nile and the neighbouring pools, and that being in such numbers there would have been no sailing on the Nile but for the ichneumon. Pococke<sup>2</sup>, on the other hand, says that he could get no account in Upper Egypt of the ichneumon destroying the eggs. There can be no doubt, however, that if in its wanderings in quest of food it came across the eggs of the crocodile, it would treat them just as it does the eggs of a domestic fowl, but that it specially searches for them seems most improbable. The fact that it does occasionally eat the eggs of that formidable monster, the crocodile, was sufficient to so raise it in the estimation of the ancient Egyptians that it became a sacred animal. The cult of the ichneumon arose in the nome of Heracleopolis<sup>3</sup> in Middle Egypt.

The lizard, *Varanus niloticus*, Hasselq. & Linn., which has a wide distribution over the Nile, is doubtless much more destructive to the eggs than the ichneumon, and as it is aquatic as well as terrestrial in its habits, it also wages war against the young of the crocodile, pursuing it even into the ranks of the adults<sup>4</sup>. It thus exercises a potent influence in preventing the undue increase of the species. The other species of the same genus, *Varanus griseus*, Daud., probably also consumes many of the eggs of the crocodile deposited on the desert banks of the river. The dexterity with which this lizard seizes and swallows a domestic fowl's egg, without breaking it by its sharp teeth, is a most interesting sight.

During the day, the crocodile generally frequents the sand islands in mid-stream, to which it is more partial than to the river bank. A. E. Brehm<sup>5</sup> describes how he observed through his field-glasses some crocodiles, that had been in undisputed possession of a sand-island for half a century, come out of the water at midday and crawl upon the island, and how they looked about to ascertain if they were safe, and, having satisfied themselves that they were so, flopped down on the sand, relaxed their legs, opened their mouths, and composed themselves to sleep. Not only is it very local in

<sup>1</sup> Hist. Bk. i. c. 6 and i. c. 3.

<sup>2</sup> *Op. cit.* vol. i. p. 203.

<sup>3</sup> Strabo, *op. cit.* p. 412; Ælian, Nat. Anim. x. 47.

<sup>4</sup> Geoffroy, Descr. de l'Égypte, 8vo ed., Hist. Nat. vi. 1829, p. 411; Klunzinger (C. B.), Upper Egypt, 1878, p. 150.

<sup>5</sup> Journ. f. Ornith. 1856, p. 491.

its habits, frequenting certain sand-islands and reaches of the river, as used to be the case 50 or 60 years ago, when it was generally to be observed at Beni Hassan, Assiut, Girgeh, Denderah, Thebes, Ombos, and Esneh, but it is more or less gregarious and is frequently found in small groups. It seldom goes any great distance from water, towards which its head is usually turned when it is basking in the sun; but it is occasionally met with in unexpected places in the Upper Nile. Sir S. Baker<sup>1</sup> relates that in the neighbourhood of Sofi, on the Atbara, he found a crocodile, about 6 feet long, lying on the dry summit of a hill far away from water. He supposed that the small stream into which the crocodile had wandered from the main river had become dry and that the animal had lost its way in quest of water. Schweinfurth<sup>2</sup> also says it is astonishing in the dry season into what tiny pools and puddles the crocodile will make its way, and buried in the miry clay will find a sufficiently commodious abode.

Abd-Allatif<sup>3</sup> states that the crocodile, in his day, was found among the rocks of the cataracts; but, Pococke<sup>4</sup> in writing of those found at Silsileh, accounts for their being so numerous there during his time, by reason of the proximity of the cataracts, as he says they retire from places in which rocks occur. Burckhardt<sup>5</sup>, on the other hand, records the presence of crocodiles on some rocky islands at Wádi Lamoule; and Sir Samuel Baker<sup>6</sup> observed a crocodile lying among rocks, and so well did it match them in colour that most probably a man would not have noticed it until too late. The crocodile, however, is undoubtedly most partial to the open reaches of the river with a sluggish current and numerous sandbanks.

Recent writers<sup>7</sup> who were not aware of the fact that the crocodile, in early Egyptian times, was distributed over the Nile even into the delta, used to explain its rarity below Akhmin by the sparseness of islands and rapidity of the current.

The monuments of the IVth Dynasty, which carry us back 6000 years—a long period doubtless in the estimation of the unreflecting, but trivial in the extreme in the history of a species,—reveal the fact that the crocodile and hippopotamus afforded sport to those resident on the banks of the Nile immediately above Cairo. The proof of this is to be found depicted on the Mastaba of Urkhuû of the IVth Dynasty at Gizeh, and on the tomb of Ptah Hotep at Sakkarah. In the former, a scene represents Urkhuû, in his funeral bark, starting on his way to the next world, the inhabitants of the water being the crocodile and hippopotamus. They may have been introduced into this picture as being symbolical of Typho; and, if so, very appropriately, because in the tomb of Ptah Hotep, of slightly more recent date, the hunting of these animals by the deceased, on the banks of the river at Sakkarah, is represented as one of his

<sup>1</sup> *Op. cit.* p. 224.

<sup>2</sup> *Op. cit.* p. 140.

<sup>3</sup> *Travels in Nubia (1812-16)*, 4to, 1819, p. 48.

<sup>4</sup> Pococke, *op. cit.* vol. i. p. 203.

<sup>5</sup> *The Heart of Africa*, ii. 1873, p. 336.

<sup>6</sup> *Op. cit.* vol. i. p. 114.

<sup>7</sup> *Op. cit.* p. 177.



pastimes. In the same tomb another scene depicts a combat between the two animals, in which the hippopotamus is victorious. The prevalence of these animals throughout Egypt in early times is moreover attested by the monuments of Beni Hassan and Thebes.

It, however, ranged further north than Gizeh, and with the hippopotamus was distributed over the streams of the delta and probably extended to lake El Timsah<sup>1</sup>; and it is recorded<sup>2</sup> that, in the time of Alexander the Great, several soldiers were devoured by crocodiles in the delta, where its existence in the beginning of the Christian era is established by the account Seneca<sup>3</sup> has given of a battle between crocodiles and dolphins of the sea, at the mouth of the Heracleotic branch of the Nile, about 22 Roman miles west of Pelusium, a tale which Pliny has reproduced, possibly on the strength of Seneca's statement.

Maçoudi<sup>4</sup>, who was in Egypt about 950 A.D., relates that Hutmen, Governor of Egypt under the Caliphs of Babylon, about 875, had discovered at Crocodilopolis the leaden figure of a crocodile the size of life and bearing an Egyptian inscription. The Governor ordered it to be broken up, and from the day that this happened the crocodiles began to do a great deal of harm; and Maçoudi remarks that the strange thing was that the crocodiles that went down to the sea harmed no one, but that on returning they killed and ate all that they could catch, and he adds, as a possible explanation, that the crocodiles in descending towards the sea found abundance of fish, but little in returning. The descent of these crocodiles doubtless was coincident with the rise of the Nile.

Maillet<sup>5</sup>, who was Consul for France in Egypt, in 1692, states that the crocodile was rarely seen in the delta in his day, but its presence there up to nearly the middle of last century is recorded by E. Brown<sup>6</sup>. Shaw<sup>7</sup>, who wrote in 1738, said that so rarely did the crocodile appear below the cataracts that the sight of one was as great

<sup>1</sup> Crocodile Lake, or Timsah, once a reedy pond of brackish water. 'Egypt,' S. Lane-Poole, 1881, p. 116.

<sup>2</sup> Ampère, *Rev. des deux Mondes*, sér. v., xix. 1844-5, p. 222.

<sup>3</sup> Seneca, *Quaest. Nat. lib. iv. cap. 2*. The following is Seneca's account:—"Balbillus, a scholar, prefect of Egypt, and a reliable man, tells of a fight he saw at the Heracleotic mouth of the Nile—the largest of the seven—between a school of dolphins from the sea and a herd of crocodiles who advanced to meet them. The crocodiles were beaten, though their adversaries are peaceable by nature and their bite is not dangerous. This was because the belly of the crocodile is soft and unprotected by scales, and the dolphins wounded them from beneath by means of the spines on their backs." The bite of a dolphin not being dangerous, according to Balbillus, and he not knowing the soft nature of the dorsal fin of a cetacean, erroneously concluded that the fin had wounded the crocodile in the most vulnerable part. But by dolphins he may not have meant cetaceans, but some large species of fish with a big dorsal spine. All that the passage establishes is the presence of the crocodile in the locality in question.

<sup>4</sup> Maçoudi, quoted by Marmol, i. (French ed., 1667) pp. 61-62.

<sup>5</sup> *Descr. de l'Égypte*, 1735, p. 32\*.

<sup>6</sup> *Travels*, ii. 1753, p. 154.

<sup>7</sup> *Travels in Barbary and Levant*, 1738, p. 427.

a curiosity at Cairo to the natives as to the Europeans. He, however, did not go south of Cairo, and, as Sonnini<sup>1</sup> remarks, had Shaw been better informed he would have learned that Upper Egypt below the cataracts was infested by crocodiles as real as they were numerous.

Towards the end of last century it had disappeared from the delta<sup>2</sup>, but small specimens were occasionally met with a little above Cairo. Its occurrence there must have been rare, as Pococke<sup>3</sup>, who visited Egypt about 1740, only met with his first crocodile at Beni Sûef, and Sonnini<sup>4</sup>, towards the close of the century, first saw the saurian at Farshût. Denon<sup>5</sup> (1798-9) first encountered it at Denderah; but he saw great numbers of all sizes at Keneh, and he remarks that they seemed to affect the banks in certain parts, particularly from Denderah to Ombos, and were most numerous at Hermentis (Erment), but apparently less so at Esneh. Henry Light<sup>6</sup> (1814) and Major Mackworth<sup>7</sup> (1821-22) record having met crocodiles at Girgeh, Cailliaud<sup>8</sup> (1826) at Denderah, and Melly<sup>9</sup> (1851) at Beni Hassan. The Rev. A. C. Smith<sup>10</sup>, writing in 1868, mentions that although he kept a daily outlook for crocodiles, he met none until he had reached El Kab; but A. L. Adams<sup>11</sup>, in 1870, records that they were occasionally seen as far down as Beni Hassan, but that it was evidently receding everywhere below the First Cataract.

Lord Fitzhardinge, whose experience of the Nile extends over many years, informs me that when he first went to Egypt, now about twenty-five years ago, there were three places north of Assuan where crocodiles were to be seen, viz. below Denderah, a rocky islet in the Nile north of Silsileh, and the sands to the south of the latter locality. Four crocodiles were generally to be seen at each of these places. Now, however, they have completely disappeared north of the First Cataract. A young crocodile may occasionally be carried past the cataract in the period of flood, but so rare has the animal become that if one were observed no rest would be given it until it was destroyed. A small specimen about 5 feet in length, and probably with a similar history, was killed below Assuan in 1890 or 1891, and the stuffed skin was preserved over the door of the quarters of one of the British officers at that town.

It is still not at all uncommon between the First and Second Cataracts, but becomes much more numerous in the direction of Dongola.

From early times, even up to the end of the 17th century, the crocodile occurred in abundance above Cairo. This is proved not only by the great number of mummified

<sup>1</sup> *Op. cit.* i. p. 331.

<sup>2</sup> John Antes, *op. cit.* p. 82.

<sup>3</sup> *Op. cit.* i. p. 70.

<sup>4</sup> *Op. cit.* iii. p. 164.

<sup>5</sup> *Op. cit.* p. 140.

<sup>6</sup> *Op. cit.* p. 47.

<sup>7</sup> Diary of a Tour through S. India, Egypt, and Palestine, 1823, p. 225.

<sup>8</sup> *Op. cit.* i. p. 293.

<sup>9</sup> Khartoum and the Blue and White Niles, 1851, i. p. 128.

<sup>10</sup> Attractions of the Nile and its Banks, i. p. 257.

<sup>11</sup> Notes on the Nile Valley and Malta, p. 53.

crocodiles found at various localities along the banks of the Nile, but by the testimony also of many authors—for example, Diodorus Siculus<sup>1</sup> and Ælian<sup>2</sup>. The latter states that they were plentiful at Ombos, Koptos, and Arsinoe, where they were reared, and that it was unsafe to walk along the bank of the river, to wash one's feet in the stream, or to draw water. Leo Africanus<sup>3</sup>, writing about the middle of the 16th century, not only mentions that they were very numerous, but adds that if all had been equally rapacious the Nile valley would have been quite uninhabitable; and Prospero Alpini<sup>4</sup> states that during his stay in Egypt crocodiles were especially abundant above Cairo, and that towards Thebes they were so numerous that it was unsafe to bathe in the river or in the lakes. Sonnini<sup>5</sup> mentions that the little boat in which he went up the river was often, in the neighbourhood of Thebes, surrounded by crocodiles lying on the surface of the water, and that they allowed him to pass with perfect indifference; and in the third decade of this century it was still very numerous in places, as a traveller<sup>6</sup> relates that in one locality he counted twenty-one in sight at one and the same time. John Antes<sup>7</sup> accounted for the absence of crocodiles in the delta and immediately above Cairo, just as Edward Brown<sup>8</sup> had done before him, by reason of the vast numbers of boats that were continuously sailing up and down the river between Rosetta, Damietta, and Cairo. A similar cause has brought about its complete disappearance below the First Cataract. The splendid work achieved by the savants attached to the French Expedition to Egypt made known the marvels of the civilization of ancient Egypt to an astonished Europe, and ultimately drew, first a few enterprising travellers from the different European nationalities, and others who entered Egypt from India by Kosseir. As years went on, the number of travellers who flocked to the Nile valley to see its wonders, or for purposes of sport, led to the creation of greater facilities for travel, of which so many have availed themselves that the Nile has at last become the highway of excursion steamers, and fleets of dahabeahs, some towed by steam-launches, and a regular service of steam-packet boats. Nearly every traveller, savant, sportsman, or inquisitive sightseer, from Europe, India, or America, has directed his arms of precision against the crocodile, which was considered one of the wonders of the Nile, and a beast, if possible, to be killed. This, and the commotion caused in the formerly tranquil river by the ever increasing traffic, have effectually freed the Lower Nile of one of its most interesting denizens, revered by the ancient inhabitants as a god, and recently so formidable that we read, in the end of the 17th century<sup>9</sup>, of its even stopping the progress of small caravans.

The Nile crocodile has always and justly been credited with great ferocity, but the

<sup>1</sup> *Op. cit.* p. 17.

<sup>2</sup> Ælian, *De Nat. Anim.* x. 24.

<sup>3</sup> Descriptt. Afr. 1554, fol., Ramusio's coll. i. p. 101.

<sup>4</sup> *Op. cit.* p. 218.

<sup>5</sup> *Op. cit.* iii. p. 297.

<sup>6</sup> Incidents of Travel in Egypt and Arabia Petræa and the Holy Land, by an American, i. 1837, p. 98.

<sup>7</sup> *Op. cit.* p. 82.

<sup>8</sup> *Op. cit.* ii. p. 154.

<sup>9</sup> Maillet, *op. cit.* p. 32\*.

degree to which it manifests this seems to depend largely on the abundance of its food-supply, as pointed out by Maçoudi <sup>1</sup> and by Schweinfurth <sup>2</sup>. Fish is its principal diet, but birds, the domestic animals found along the banks of the Nile, baboons <sup>3</sup>, and man himself, all fall to it as prey. It either seizes its prey directly with its jaws or, by means of its powerful tail, whisks its prey within reach of them, dragging it under the water.

Notwithstanding the nature of its food it is eaten by the Sudanese and by other African tribes <sup>4</sup>, apparently by reason of its reputed aphrodisical properties.

Herodotus <sup>5</sup> says that as the crocodile "lives chiefly in the river it has the inside of its mouth constantly covered with insects that suck its blood; all other beasts and birds avoid it: with the trochilus alone it lives at peace, because this little bird renders it a great service; for the crocodile when it leaves the water and comes out upon the land is in the habit of lying with its mouth wide open facing the western breeze; at such times the trochilus goes into the crocodile's mouth and devours the insects it finds there, and the crocodile, recognizing this, does the bird no harm." Pliny's <sup>6</sup> account, which is somewhat different, is as follows:—"When the crocodile has eaten, it goes to sleep on the banks, when a little bird, known in Egypt as the trochilus, and in Italy as the king of birds, in order to obtain food, invites the crocodile to open its jaws, then, hopping to and fro, it first cleans the outside of its mouth, next the teeth, and then inside, when the crocodile opens its jaws as wide as possible, on account of the pleasure it experiences from the titillation. It is at these moments that the ichneumon darts down its throat and eats its way out through its belly." Geoffroy St.-Hilaire <sup>7</sup> held that the word  $\beta\delta\epsilon\lambda\lambda\alpha$ , as applied by Herodotus to the insects in the mouth of the crocodile, in its original meaning signified animals that suck, but that ultimately it became specialized and was applied to the true leeches, *hirudo*. The word, Geoffroy held, was not used by Herodotus in the latter specific sense, but referred to insects, such as gnats, which suck blood. Herodotus, however, explains the presence of the sucking animals in the mouth of the crocodile as being due to its aquatic habit, which does not coincide with Geoffroy's supposition that they were aerial insects. Aristotle <sup>8</sup>, who also mentions the supposed intimacy subsisting between the trochilus and the crocodile, while he offers no explanation of the word  $\beta\delta\epsilon\lambda\lambda\alpha$  used by Herodotus, says that the bird flew into the mouth of the crocodile because it found food about its teeth, which nourished it.

From the accounts Geoffroy received from the fishermen and by personal knowledge he became aware that the crocodile, when it comes out of the water to repose, is

<sup>1</sup> Marmol, l. c. pp. 61-62.

<sup>2</sup> *Op. cit.* ii. p. 336.

<sup>3</sup> Sir S. Baker, *op. cit.* p. 241.

<sup>4</sup> 'A Collection of Curious Travels and Voyages,' 1693, ii. pp. 177-180; Baker's 'Albert Nyanza,' ii. p. 122, and 'Nile Tributaries,' p. 166; 'Ismailia,' i. p. 57; J. W. Gregory, 'The Great Rift Valley,' 1896, pp. 277-278.

<sup>5</sup> ii. to xvii.

<sup>6</sup> Nat. Hist. Bk. viii. c. 37.

<sup>7</sup> Descr. de l'Égypte, Nat. Hist. (8vo ed.) vi. 1827, p. 432.

<sup>8</sup> Hist. Anim. ix. vii. 3.



assailed by a swarm of gnats. He experimented with a dead crocodile, and he says its mouth was not so hermetically closed that gnats could not find an entrance, and consequently he discovered the palate of this dead animal covered with a brownish-black crust, made up of a multitude of gnats, ranged side by side, with their trunks buried in the ducts of the glands that abound in the mouth of the crocodile. He believed the same happened in the case of a living crocodile basking with its mouth open on a sandbank, but whether this really does occur he had no means of testing by actual observation. Nevertheless he accepted it as an established fact, and adds:—  
 “Il est certain que si, dans l'état d'imperfection de ses organes, le crocodile eût été, au grand jour de la création, réduit à ses seuls moyens, c'est à dire qu'il eût été délaissé sans autre ressource, cette espèce n'aurait pu traverser les siècles et arriver à nous.”  
 The imperfections of structure to which he referred were the seeming inability of the crocodile to free its palate from gnats by the use of its fore limbs and the nearly immobile character of its tongue. He did not accept Aristotle's statement that the trochilus entered the crocodile's mouth to clean its teeth, as he thought that the animal itself could perform this part of its toilet with its hind feet. The difficulty of a crocodile freeing its mouth from insects, should they enter and settle on it, seems purely imaginary, as the mere closure of the mouth would at once suffice, not only to exclude them, but also to destroy them effectually.

The habit of lying with the mouth open is not confined to large crocodiles, as the young do the same; but as all the birds hitherto regarded as the crocodile bird are of such dimensions that they could not enter the mouth even of a specimen one-third grown, far less that of the young, the question naturally arises, if the trochilus is so essential to the existence of the crocodile, how are the mouths of these young specimens freed of their mortal foes?

Everyone acquainted with Egypt knows how the domestic animals in the fields and on the banks of the river are pestered by the attacks of insects, and how birds are drawn towards them in quest of their insect prey, and tolerated by the cattle, asses, and camels owing to the relief they afford. It is the same with the crocodile and the hippopotamus.

The crocodile, however, from the nature of its food, is the host of many parasitic worms<sup>1</sup>, which, while the animal lies basking in the sun, find their way into its mouth, doubtless brought up by the stimulating action of the air on the pharynx, and reflexly on the œsophagus and stomach. The presence of these worms would also prove an attraction to some birds, and it was doubtless to them that Maçoudi<sup>2</sup> referred when he said that whatever the crocodile eats turns into worms in its belly; and he added that the crocodile, whenever it felt itself inconvenienced by them, came out of the water on

<sup>1</sup> Mr. Wenham (Gould's 'Birds of Asia,' vii., art. *Pluvianus aegyptius*, April 1865), who dissected a Nile crocodile 14 feet long, could not find any parasites, but they are known to exist all the same.

<sup>2</sup> Les Prairies d'Or (Trans. Soc. As. Paris, 1861-74), i. p. 235.

to the land and lay down and opened its mouth, when water-birds, such as the Taitawī, the Hāsani, the Shāmirek, and other sorts, came to eat them, a story which was repeated by Makrizi<sup>1</sup>.

It has been stated by Aristotle<sup>2</sup> and Pliny<sup>3</sup>, and repeated by some modern authors, that animal matter so accumulates about the teeth of the crocodile that birds are attracted by it, and even venture to pick it off from them. Considering the entire absence of movement in a reposing crocodile, this may possibly occur, but that a crocodile would refrain from closing its jaws on a bird that entered its mouth out of consideration for the service rendered by it, is too absurd to merit serious consideration. Burckhardt<sup>4</sup> also states that the crocodile brings up digested food from its stomach, and that a bird enters its mouth to feed upon it! The probability is that if any particular species of bird has the habit, many an individual has lost its life by so doing.

The name commonly given to the smaller plovers by the ancient Greeks was *τροχίλος*, the term applied by Herodotus to the little bird which he described as freeing the mouth of the crocodile of *βδέλλα*. It is impossible, however, to say what species of bird Herodotus<sup>5</sup> and Aristotle<sup>6</sup> had in view. Pliny<sup>7</sup>, on the other hand, says that it was the bird known in Italy as the king of birds, viz. a wren; but Plutarch<sup>8</sup> ascribed to it habits that rendered Pliny's supposition impossible, as he states that the bird delighted in the borders of marshes and rivers. Ammianus<sup>9</sup>, who was alive about 390 A.D., and who has a reputation for accuracy, says no more than that the trochilus was a small bird; while Maçoudi<sup>10</sup> only speaks of it as a bird having the habit of approaching the crocodile and eating the worms that come out of its mouth.

Cardano<sup>11</sup>, in his great work, speaks of the crocodile-bird as a wren, having apparently accepted Pliny as his authority; but Scaliger<sup>12</sup>, in his bitter criticism of Cardano's work, pointed out that the bird was not a wren. Aldrovandus<sup>13</sup>, doubtless having in view Plutarch's description of the habits of the crocodile-bird, conjectured that it might be *Charadrius gallicus*, a suggestion that has not been adopted by any other author, although the habits of this bird are such that it is found in the localities frequented by basking crocodiles.

Marmol<sup>14</sup> describes the bird as white in colour and of the size of a thrush; and also says: "Ces oiseaux y entrent et sortent en toute assurance; car quand mesme le crocodile voudroit refermer la gueule il ne pourroit, parceque la nature a donné à ces oiseaux une

<sup>1</sup> Descr. Topograph. et Hist. de l'Égypte, trad. par M. Bouriant, 1895, p. 189.

<sup>2</sup> Hist. Anim. ix. vii. 3.

<sup>3</sup> Nat. Hist. Bk. viii. c. 37.

<sup>4</sup> Op. cit. p. 24.

<sup>5</sup> Herod. ii. 68.

<sup>6</sup> Hist. des Anim. t. iii. 1883, par J. B. St.-Hilaire, p. 157.

<sup>7</sup> Hist. Nat. lib. viii. cap. 37.

<sup>8</sup> Œuvres du Plutarque, J. Amyot, 1784, xiii. p. 357.

<sup>9</sup> Ammian. Marcellinus, xxii. (Hamburg, 1609), p. 248.

<sup>10</sup> Op. cit. i. pp. 235-6.

<sup>11</sup> De la subtilité et subtiles inventions &c., 1551 (French ed. 1556), p. 188.

<sup>12</sup> Exotericarum Exercit. lib. xv. de subtil. ad H. Cardano, 1557, Exerc. 196, sect. 5.

<sup>13</sup> Ornith. tomus alter. (2) 1645, p. 649.

<sup>14</sup> Op. cit. lib. i. cap. 22.

épine sur la teste avec laquelle ils piquent le haut du palais du crocodile, et lui font ouvrir la gueule malgré qu'il en ait." This reference to the bird being provided with a spine, wrongly placed, however, by Marmol, is of interest when taken in connection with the story told by the Arabs of the present day. Indeed his account was in all probability derived from the Arabs he met with during his visit to the Nile valley.

Père Sicard<sup>1</sup>, in one of his letters from Egypt written in the first or second decade of the last century, mentions the *sagsag*, the ibis, Egyptian goose, and little egret as birds of the Nile, and adds that the first is the trochilus of the ancients. The term sag-sag or zig-zag is rendered in Arabic زترق, and is applied by the inhabitants of Egypt to *Hoplopterus spinosus*, also known to them as سيسه=Sisah, and appropriately by still another name, viz. ابو شوكه=Abu choka, or the father of spines. The term Sisah is also applied to *Pluvianus aegyptius*.

When Geoffroy St.-Hilaire was at Thebes he learned that there was a small bird that flew without ceasing from place to place, "jusque dans la gueule du crocodile," asleep or feigning to be so, attracted to it by the presence of insects. This bird, he says, was seen everywhere along the Nile, and when he became possessed of a specimen he recognized in it a species that had already been described by Hasselquist under the name of *Charadrius aegyptius*. On carefully considering what Geoffroy says about this bird, it is evident that the species he obtained could not have been *C. aegyptius*, as has been generally supposed<sup>2</sup>. He says "nous avons, en France, un oiseau très-voisin, s'il n'est le même; c'est le petit pluvier à collier," and in another passage he speaks of it as "le petit pluvier." If he had had *Charadrius aegyptius* before him he would never have made this comparison, as there is no bird in France at all resembling it, and, besides, it could never be said by anyone knowing the two birds, *C. aegyptius* and *Ægialites cunonica*, that they might perhaps prove to be identical, which, however, is perfectly true of the "petit pluvier à collier" of Egypt and France. Moreover, from the fact that he states that the bill of his supposed trochilus was so fine that it could only pick up small insects, the spawn of fish, or little fragments of animal matter cast up by the river, it is perfectly clear that he was not dealing with a bird having the strong bill of *Charadrius aegyptius*, but with "un oiseau très-voisin, s'il n'est le même; c'est le petit pluvier à collier." This appears to be a perfectly legitimate conclusion. The lesser ringed plover, according to the majority of ornithologists who have written on the birds of Egypt, is universally distributed and very common. From its habits it is quite as likely to fly about and even to settle on a sleeping crocodile as any of the other birds to whom the habit has been ascribed, and, moreover, we have Geoffroy's testimony that he had seen it flitting from place to place, "jusque dans la gueule du crocodile endormi ou feignant de l'être."

<sup>1</sup> Lettres édifiantes, v. nouv. éd. 1780, p. 351.

<sup>2</sup> Dictionary of Birds, by A. Newton and H. Gadow, part iii. 1894, p. 733 footnote.

Geoffroy, believing that he had before him the true trochilus of Herodotus, and being aware that the Jesuit Sicard had stated that the *sag-sag* of the Arabs was the trochilus, applied this term to his bird (*Ægialites curonica*), which he had erroneously identified with *Pluvianus aegyptius*. Other authors, in accepting his identification, have thus used the term *zig-zag* for the wrong bird (*Pluvianus aegyptius*), but Gurney<sup>1</sup> has correctly applied it to the plover (*Hoplopterus spinosus*). It is thus evident that the bird which Geoffroy saw entering the crocodile's mouth was not *P. aegyptius*. It is noteworthy, moreover, that Brehm<sup>2</sup>, who is the only other observer, until recent years, who has stated that he had seen *P. aegyptius* enter the crocodile's mouth, calls it the *zig-zag*, whereas Heuglin<sup>3</sup> says that it is known to the Arabs as the *Ter el Temsach*, *i. e.* *Tayir el Timsah*, in Arabic *تمساح طائر* = crocodile-bird.

Dr. A. Leith Adams<sup>4</sup>, however, has pointed out that the Arab story, which was told to him in much the same words, apparently, as it was recounted to Marmol<sup>5</sup>, more than three and a half centuries ago, is always related of the *zig-zag*. Geoffroy ridiculed Blanchard's<sup>6</sup> remark about the bird having a spine either on its back or at the end of its wings; and so little did he think of *Hoplopterus spinosus* as possibly being the bird, that he threw out the supposition that Blanchard had been influenced by some remarks on the crocodile-bird made by Scaliger<sup>7</sup>, and had mixed up with them a passage in which Strabo<sup>8</sup> speaks of the fish *porcus* having spines on its pectoral fins, and adds that Marmol, who ought to have been better informed, as he had visited Egypt, had repeated what Scaliger had said about the bird. But Strabo merely says the crocodiles never touch the *porcus*, a round fish, as it has the head provided with spines dangerous to the crocodile. In Marmol's description of the bird, as has already been seen, there is no mention of spines on the wings; but Blanchard states: "la nature a donné aux plumes du petit oiseau, soit sur le dos, soit au bout des ailes, une roideur qui picoterait durement les parties charnues de la gueule du crocodile, s'il vouloit la fermer," thus supplementing Marmol's indication, and, in so doing, suggesting *Hoplopterus spinosus* to future observers.

Mr. J. M. Cook<sup>9</sup> has recorded that he has seen the true *zig-zag* (*Hoplopterus spinosus*) go deliberately up to a crocodile apparently asleep, the latter open its jaws, the bird hop into the mouth, and the jaws close upon it. In little more than a minute or two the crocodile opened its mouth, the bird came out and ran down to the water; and this he saw repeated three times, but witnessed it through field-glasses at the distance of

<sup>1</sup> Rambles of a Naturalist in Egypt, 1876, p. 198.

<sup>2</sup> Ornith. Nordost-Afr. 1873, ii. p. 978.

<sup>3</sup> Ibis, 1864, p. 29.

<sup>4</sup> Mém. de l'Acad. des Inscript. ix. 1736, 2 sect. p. 25.

<sup>5</sup> Op. cit. Exerc. 196, sect. 5.

<sup>6</sup> Ibis, 1893, p. 276.

<sup>7</sup> Thierleben, Vögel, 2nd ed. vol. iii. p. 266.

<sup>8</sup> Op. cit. cap. 22.

<sup>9</sup> Op. cit. lib. xvii. 1819, p. 446.



half a mile! The improbability of any bird coming out alive from the closed mouth of a crocodile is so great, and the proceeding on the part of the bird itself, as recorded by Mr. Cook, so meaningless (as it would be impossible for it to feed when the mouth was shut), that the observation cannot be accepted as reliable.

One way in which the birds that have been mentioned, but especially *H. spinosus* and *P. ægyptius*, are unquestionably useful to the crocodile, is testified to by Ælian<sup>1</sup>, and by every sportsman on the Nile, for no sooner is a man detected approaching than these birds utter their clear notes, thus warning the crocodile of impending danger.

Now that the Nile above Wádí Halfa, where crocodiles abound, has once more been thrown open to Europeans, it is to be hoped that some one interested in the habits of animals may find out what species of birds associate with the crocodile, how they comport themselves to it, and what service, if any, they render to it<sup>2</sup>.

Brehm<sup>3</sup>, Heuglin<sup>4</sup>, Dresser<sup>5</sup>, and others have said that *Pluvianus ægyptius* is U in the hieroglyphic alphabet of the Egyptians, and it is even stated that the Egyptians of old were well acquainted with it, and that it frequently occurs on wall-paintings. I have gone carefully through the literature bearing on the wall-paintings of Egypt, but I have not been able to find a single representation of *Pluvianus ægyptius*. The U of the alphabet is unquestionably a newly-fledged domestic chicken, a most important bird with the Egyptians, who, then as now, largely if not exclusively brought all their poultry to life by artificial incubation. The wings devoid of quills, the absence of tail-feathers, and the generally imperfect character of the feathering of the bird of the hieroglyph U are all distinctive of a bird that has just left the egg. By some Egyptologists I believe the figure has been taken for a quail.

The great Roman satirist<sup>6</sup> says:—"Who does not know what kinds of monsters demented Egypt worships? One part adores the crocodile, another quakes before the ibis gorged with serpents . . . whole houses venerate cats, here a river-fish, and there a dog" . . . This animal-worship in Egypt shows traces of a savage ancestry that goes back to a period long ages before the construction of the oldest monuments of the Nile valley, to the days when the groups of prehistoric men dotted along the banks of the

<sup>1</sup> *Op. cit.* viii. 25.

<sup>2</sup> Additional literature bearing on this subject:—

Brehm, *Journ. f. Ornith.* 1856, p. 491; E. C. Taylor, *Ibis*, 1859, p. 52, 1867, p. 68; S. S. Allen, *Ibis*, 1863, p. 156; Gould's 'Birds of Asia,' vii. 1865, article *Pluvianus ægyptius*; J. H. Gurney, jun., 'Rambles of a Naturalist in Egypt, &c.,' 1876, p. 198; Dresser's 'Birds of Europe,' vii. 1878, p. 522 & p. 542; Klunzinger, 'Upper Egypt,' 1878, p. 150; D'Aubusson, 'Échassiers d'Égypte,' p. 16; 'Dictionary of Birds,' Newton & Gadow, pt. iii. 1894, p. 733 footnote.

<sup>3</sup> Thierleben, Vögel, iii. 2nd ed. p. 266.

<sup>4</sup> Ornith. Nordost-Afr. p. 978.

<sup>5</sup> Birds of Europe, vii. p. 523.

<sup>6</sup> Juvenal, Sat. xv. 1.

great river had their tribal fetishes and deified totems<sup>1</sup>. The problem yet to be solved is how the superstition of these primitive men became modified, and evolved into the complex system of animal-worship distinctive of historical Egypt. Immense materials having a distinct bearing on this subject are accumulated in the museums of nearly every European nation, but as yet we are as far off from its solution as ever.

The fact that the crocodile was both revered and detested by different communities along the banks of the Nile seems to favour the supposition that its worship was a survival either of fetishism or totemism. It was carefully nurtured and fed by the priests in certain localities, while in others it was ruthlessly slain<sup>2</sup> and even eaten.

Various trivial explanations, however, have been offered as to the origin of its worship. Diodorus Siculus says it may be asked, how is it that an animal that devours man should receive the reverence paid to a deity? and as an answer he adduces as a reason that which had already been advanced by Cicero before him, viz. that not only the Nile, but the crocodiles inhabiting it were a protection to the country, as were it not for the prevalence of the crocodile the homesteads of the people would have been pillaged either by robbers from the east (Arabia) or from the west (Libya), who were deterred from swimming across the Nile by the fear of being devoured by the saurian. This explanation is interesting because it shows how numerous crocodiles were in the first century of the Christian era, largely brought about doubtless by their having been carefully preserved for ages at certain towns, such as Kom Ombos, Thebes, Koptos, and Crocodilopolis-Arsinoe in the Fayum, or lakeland; but as an explanation of the origin of the cult it is worthless. Also in keeping with the state of knowledge in the time of Diodorus is the supposition he quotes, viz. that the worship of the crocodile arose because Mena, the first king of Egypt, had been saved from his dogs, that had pursued him to lake Mœris, by a crocodile which carried him in safety on its back to the opposite bank. De Pauw<sup>3</sup> advanced the theory that as "the crocodile was widely distributed in the flooded Nile, its appearance in places remote from the main stream signified water fit for drinking and suited for the irrigation of the land, and that consequently the Government encouraged its worship, believing that the superstition, as long as it lasted, would be the means of keeping the canals open, especially in such cities as Koptos<sup>4</sup> and Arsinoe, which lay at some distance from the river."

<sup>1</sup> Tylor, 'Primitive Culture,' ii. p. 238, 2nd ed.

<sup>2</sup> Strabo, *op. cit.* p. 418.

<sup>3</sup> Rech. Phil. sur les Egyptiens et sur les Chinois, ii. (1773, Berlin), p. 122.

<sup>4</sup> This may have been the case in Ptolemaic and in Roman times, but Professor Petrie, "from the configuration of the base soil" about Koptos, says that "it seems not improbable that the river ran close to the western side of the town in the earliest times" (Koptos, 1896, p. 1).

Sir J. G. Wilkinson<sup>1</sup> also held that the reverence paid to the crocodile and to certain fish had nothing whatever to do with religion originally, but had been instituted by authority for the reason suggested by De Pauw.

Whatever may have been the origin of the cult, the crocodile, in certain localities, was sacred to and the emblem of Sebek, the water-god, who caused the Nile to rise. In other places it was the symbol of impurity and an emblem of Typhon, and was ruthlessly destroyed.

Under the new Empire, Sebek ultimately became identified with the God "Ra," and in the Fayum he was represented, in human form, with the head of a crocodile, horns, sun-disc, and feathers. The simplicity of the original religion became obscured by fanciful speculations; but, at the same time, the tendency seems to have been towards a monotheism rich in individualized attributes.

As the impersonification of evil, the crocodile is not unfrequently represented in cippi as under the feet of Horus, the avenger of Osiris. In a cippus of this nature in the possession of Professor Petrie, and probably not older than the XIXth Dynasty, Horus stands on two crocodiles, holding a lion by the tail and two serpents in his left hand, and an oryx by its horns in his right hand. A quiver of arrows is across his shoulders. Over the head of the deity are the wings and disc, but no serpent, simply indicating the protection of the Sun. The lion and the serpent were both forms typical of Typhon, while the oryx likewise, according to Champollion, was also emblematical of the evil principle. In remarkable contrast to this is the elaborate cippus of Ptolemaic date figured by Wilkinson<sup>2</sup>.

The hippopotamus, which had much the same distribution in the Nile in former times as the crocodile, and only disappeared from the delta towards the end of the 17th century<sup>3</sup>, was also an emblem of Typhon, and worshipped at Papremis<sup>4</sup> (Chois) in the delta. In the papyri and on the monuments there are curious figures made up of these two animals, as, for example, in the papyrus of Ani, to take a single illustration among many others, in which a crocodile's head takes the place of that of a hippopotamus, the fore quarters of the latter becoming those of a leopard; but many other complex figures are met with. The hippopotamus itself, sitting erect on its hind-quarters, with pendulous human-like mammæ, represents the Goddess Thâeris, in Egyptian Ta-ûrt, or "the Great," said to be the concubine of Typhon; and figures of this nature are met with, having a crocodile, the male personification of evil, clinging on to her back.

Professor Petrie has recently published some most important results attained by him at Koptos<sup>5</sup>, and I have to thank him for having permitted me to examine the two earliest figures extant of the crocodile, modelled in Nile clay. They were discovered

<sup>1</sup> Rawlinson's Herod. ii. 1880, p. 76, note 5.

<sup>2</sup> The Ancient Egyptians, iii. pl. xxxiii.

<sup>3</sup> Maillet, *op. cit.* p. 31 \*.

<sup>4</sup> Herod. ii. 71.

<sup>5</sup> Koptos, 1896.

among a number of earthenware figures of men and animals found in the sanctuary of the oldest temple at Koptos. Professor Petrie regards them as having been dedicated in the temple, and therefore as representing the best work of their time. One represents a rudely executed figure of a crocodile, more or less imperfect, while the other, which is much superior to it in execution, is merely a fragment of the tail of a crocodile-figure of still larger size, which when entire must have been a work of art, if the details of the scaly covering were as accurately represented in the rest of it as they are in this fragment. Unlike the first, it was faced with red hæmatite.

The evidence collected by Professor Petrie lends its sanction to the conclusion he has arrived at that these figures go back to the IIIrd Dynasty, a transition-period in the history of Egyptian art, in which modelling in clay was being gradually replaced by sculpturing in stone. Such considerations as these, and the fact that Koptos was one of the headquarters of the worship of the crocodile, taken in connection with the discovery of these figures in the sanctuary of a temple, render them of considerable interest.

Professor Petrie and Mr. Quibell, in their discoveries in the extensive cemeteries along the edge of the desert between Naquada and Ballas<sup>1</sup>, have brought to light a mass of non-Egyptian remains of an invading people who occupied the Thebaid alone, between 3300 and 3000 B.C., and whom their discoverers have called "the foreigners" or "New Race." This people, probably a branch of the Libyan race, preserved an entirely different culture from the Egyptians, with whom apparently they had no connection; but with them they were equally impressed by the might of the crocodile, and depicted its capture on their pottery, in a very primitive fashion<sup>2</sup>.

From the IVth Dynasty downwards to Ptolemaic times the crocodile is frequently represented on the monuments, on papyri, and also on other objects, such as coffins. Moreover, numerous representations of it are met with sculptured in stone and cast in metal, and a drawing on a papyrus at Turin represents it in a serio-comic attitude as a member of an orchestra of animals parodying a human concert.

The most ancient representation of a crocodile, as a hieroglyph on the monuments, is to be found on Nefermat's tomb near the pyramid of Medum<sup>3</sup> of the IVth Dynasty. Here Nefermat stands with a son before him, and his wife, Atet, below him with three sons, one of whom is designated chief of the lake of the crocodile, which, Professor Petrie points out, is of especial interest, as it is the earliest mention of the Fayum.

In hieroglyphs, the figure of a crocodile generally meant only crocodile, as, for example, in the tomb of Nefermat, and in the prayer in the 'Book of the Dead,' which

<sup>1</sup> 'Naquada and Ballas,' by Messrs. Petrie, Quibell, and Spurrell, 1896.

<sup>2</sup> *Op. cit.* pl. xxxv. 78.

<sup>3</sup> Medum, 1892, p. 25, pl. xviii.



exclaims "Deliver me from the crocodiles in this land" <sup>1</sup>. It also appeared in the proper names of private individuals, as, for instance, in the stele mentioned by Champollion <sup>2</sup> the younger, in which a male and female are spoken of as the children of the crocodile, or, ideographically, of Sebek. It was likewise used as a determinative of certain phonetic groups. On the other hand, one of these groups, signifying Sebek, was occasionally replaced in the texts by a figure of the god himself, in human form, but with the head of a crocodile. The same deity was ideographically represented by a crocodile lying on a pediment.

Another hieroglyph relating to the crocodile was the one first mentioned by Herapollo <sup>3</sup>, who says "that when the ancient Egyptians would write 'darkness' they use the tail of a crocodile." This sign, a fragment of the tail, also meant "black," and likewise formed part of one of the phonetic groups for a name of Egypt.

The apparently most northern limit of the distribution of this species is the Zerak and Kishon rivers in Syria <sup>4</sup>. It occurs throughout the Nile and its tributaries, and in nearly all the rivers of Africa from the Shebeli in Somaliland, southwards to the Cape of Good Hope, thence northwards to the Senegal river, also in all the more important lakes, and in the island of Madagascar.

It probably once had a wider range in Syria than at present, as Saligniac, 1525 A.D. <sup>5</sup>, relates that when he was bathing in the Jordan with some other pilgrims, one of their company, a French physician, having ventured farther into the river than the others, was carried off by a crocodile.

According to the Chronicles of Sicily <sup>6</sup> the crocodile has appeared from time to time in that island, in the waters of the Papireto and the Garaffello, near Palermo; in the environs of Messina; and in the river Amenano, close to Catania. It has also been stated that the Romans obtained crocodiles, for combat in the arena, from Cyrenaica; but as there are no rivers in that country in which these saurians could live, they were doubtless, in the first instance, imported to Cyrene from Egypt.

<sup>1</sup> Renouf, 'Elementary Grammar of Ancient Egypt. Lang.,' 1875, p. 21.

<sup>2</sup> Syst. Hieroglyph. 1828, p. 29, nos. 214 & 215.

<sup>3</sup> Lib. i. 70.

<sup>4</sup> Pococke, *op. cit.* vol. ii. pt. 1, 1745, p. 58; Tobler, Petermann's Mitth. 1858, p. 8; Friedel, Zool. Gart. x. 1869, p. 161; Mettenheimer, Zool. Gart. xiii. 1872, p. 237; Boettger, Ber. Senck. nat. Ges. 1879-80, pp. 199-206.

<sup>5</sup> Iter, Bk. ix. chap. vi.

<sup>6</sup> Doderlein, Ann. Soc. Nat. Modena, vi. 1872, pp. 202-3.

## CHELONIA.

## TESTUDINIDÆ.

## TESTUDO.

*Testudo*, *part.*, Linn. Syst. Nat. i. 1766, p. 350.

## TESTUDO LEITHII, Günther. (Plate II.)

*Testudo græca*, Lichtenstein (*nec* Linn.), Verz. Doubl. Mus. Ber. 1823, p. 91; Rüppell, Neue Wirbelth. 1835-40, Amph. p. 4; Peters, Monat. Berl. Ak. 1880, p. 305.

*Testudo marginata*, *part.*, Dum. & Bibr. ii. 1835, p. 37; *part.*, A. Dum. Cat., Rept. 1851, p. 3.

*Testudo leithii*, Günther, Proc. Zool. Soc. 1869, p. 502, figs.; Boulenger, Cat. Chel. B. M. 1889, p. 175; Anderson, Herpet. of Arabia & Egypt, 1896, p. 95.

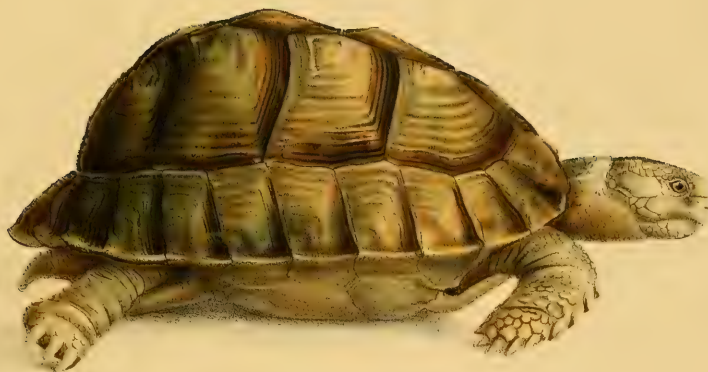
*Testudo kleinmanni*, Lortet, Arch. Mus. Lyon, iii. 1883, p. 188, et iv. 1887, p. 11, pl. v.; Tristram, West. Palestine, Rept. & Batr. 1884, p. 156.

*Testudo campanulata*, D'Aubusson, Bull. Inst. Egypte, fasc. vi. 5th May, 1893.

1 ♂ and 1 ♀, neighbourhood of Alexandria; 1 ♂ and 1 ♀, Maryut District.

The depth more than half the length of the shell; carapace broadly notched in front, expanded behind the second costal; marginals forming a more or less serrated border, with the undivided supracaudal projecting beyond them. The nuchal shield narrow, elongate, and triangularly unguiculate; first vertebral more or less rounded anteriorly, slightly broader than long; second nearly as long as broad; third quadrangular, about one-fourth broader than long; fourth hexagonal, broad anteriorly, its posterior equalling a little more than one half its anterior breadth; fifth hexagonal, much broader posteriorly than anteriorly, but not broader than the third vertebral. The gular about two-thirds the length of the humeral suture; pectoral slightly shorter than the humeral suture; abdominal more than twice as long as the humeral suture, and as long as the conjoint femoral and anal sutures; the anal four times as long as the femoral suture. Head of moderate size; an azygos supranasal succeeded by two large frontonasals; a single prefrontal followed by a rather small frontal, broad anteriorly but narrow posteriorly, embraced laterally by a very large shield, covering the rest of the upper surface of the head. A number of supraorbital scales, and a large temporal plate. Anterior surface of the fore limb covered with a few very large imbricate scutes in three longitudinal and five transverse series, the scale at the elbow-joint projecting in a strong point. No enlarged femoral tubercle.

Colour yellowish or pale greenish yellow; the plates of the carapace more or less margined with brown or blackish, restricted in the vertebrae chiefly to their anterior and lateral margins, and in the costals to their anterior and external-lateral margins. The plastron yellow, with a dark-brown spot about the middle of the anterior border of the abdominal, and, occasionally, a much smaller similarly coloured spot on the outer



H. Gronovold del et lith

TESTUDO LEITHII.

♀, nat. size. Suburbs of Alexandria.





margin of the front border of the pectoral. Head yellowish or dusky, with some dark brown on its upper surface.

The shell of the female attains only to 120 millimètres in length.

As in *T. ibera*, Pallas, and *T. marginata*, Schoepff, the hind lobe of the plastron is movable in the adult.

This species is distinguished from *T. marginata*, Schoepff, by its much smaller size, shorter and deeper carapace, backwardly projecting supracaudal, extremely large scales on the fore limb, and by its coloration. In *T. marginata* the adult is nearly black, each shield has generally a small greenish-yellow spot, and there is a large black spot on each shield of the plastron.

An example of this species was obtained by Lefèbvre in Egypt and is still preserved in the Paris Museum. It was referred by A. Duméril to *T. marginata*, Schoepff. There is also a specimen in the Berlin Museum from Egypt, identified by Lichtenstein as *T. græca*.

In 1869, the British Museum received a small collection of Reptiles from Sind, presented by Dr. Leith. It contained a new species of land-tortoise to which Dr. Günther gave the name of *T. leithii*.

In 1875, Dr. Lortet received a land-tortoise from the neighbourhood of Alexandria. He considered it to be distinct from *T. marginata*, Schoepff, and named it after its discoverer M. Kleinmann. Dr. Lortet presented one of M. Kleinmann's specimens (a female) to the British Museum, so that when Mr. Boulenger came to prepare his 'Catalogue of Chelonia' he had before him the types of *T. leithii* and *T. kleinmanni*. The result of his comparison of the two has been to establish the specific identity of *T. kleinmanni*, Lortet, with *T. leithii*, Günther.

No example of *T. leithii*, Günther, has been recorded either from Sind or from any locality to the east of Southern Syria, since Dr. Günther first described the species. In view, however, of the facts that the land-tortoise of Egypt, which, according to Lortet, occurs in great numbers about Alexandria, was overlooked by the naturalists of the French Expedition in the end of last century, and that, up to 1875, it had only been reported from Egypt on two occasions, it might seem, to some, premature to conclude that it does not exist in Sind. The most likely explanation of its presence there, however, may possibly be that Dr. Leith's specimen had been carried thither, by some native, either from Egypt, or perhaps from the north-western shore of the Persian Gulf, and had been sold to Dr. Leith as a Sind tortoise.

Dr. Lortet gives the following interesting account of this species:—"Le *T. kleinmanni* n'a été trouvé, jusqu'à aujourd'hui, que dans une région très limitée de l'Afrique. Je l'ai reçu en 1875, pour la première fois, d'Alexandrie, où elle a été découverte en très grande quantité par M. Kleinmann. Je l'ai trouvée aussi à Damiette et aux environs de Port Said. Malgré mes recherches des plus attentives, je n'ai point vu cette charmante petite espèce dans les environs du Caire, ce qui me ferait croire qu'elle

est spéciale au Delta et à la Basse-Égypte. Autour d'Alexandrie, on la rencontre abondamment dans des herbes du rivage et sur les bords des lacs salés ou saumâtres. Elle se nourrit surtout de différentes espèces de Salsolacées et de Statice. Elle pénètre aussi souvent dans les cultures et les jardins.

"En 1880, un savant voyageur, M. Barbey, de Genève, m'a communiqué un *T. kleinmanni* trouvé par lui, sur le sable du déserte Egypto-Syrien près d'El-Arisc, l'ancienne Rhinocoloura.

"À moins que la température ne s'abaisse considérablement en Égypte, comme cela a eu lieu pendant l'hiver 1879-80, cette espèce ne s'engourdit pas, et surtout ne s'enterre pas comme les *T. ibera* et *marginata*. Elle reste, au contraire, très alerte pendant la saison hivernale. À Lyon, elle entre en somnolence dès que la température moyenne s'abaisse à +8, mais cependant, elle ne cherche point à se cacher sous le sol. Elle se contente de s'abriter au milieu des feuilles mortes ou des herbes. Elle ne mange alors plus rien et périt facilement si on la laisse exposée à une température de quelques degrés au-dessous de zéro. Les *T. ibera*, *marginata* et *græca* supportent, au contraire, sans paraître en souffrir, une température s'abaissant à -8 ou -10.

"L'accouplement se fait en mars et avril. En mai, les œufs sont pondus par la femelle, qui les abandonne simplement sur le sol. Ces œufs, de la grosseur de ceux d'un pigeon, sont presque entièrement sphériques et teints en rose éclair. Lorsque la température est suffisamment élevée, les jeunes sortent de l'œuf vingt jours après la ponte. Ils sont entièrement jaunes et atteignent à peine la dimension d'une pièce d'un franc."

My own observations fully verify those of Dr. Lortet regarding its absence in the southern part of the delta. I made a very careful search for it in the neighbourhood of Cairo, but failed to find it, and all the natives who were questioned on the subject assured me that they had never seen it in the vicinity of that city.

It has probably a considerable range to the west of Egypt, as Peters records, under the name of *T. græca*, a tortoise collected by Rohlf's and Stecker on their journey to the Oasis of Kufra.

Pliny states that numbers of tortoises wandered in the deserts of Africa, and Ælian that they were found in the Libyan desert, a statement which is repeated by Marmol; but neither Prospero Alpini nor Maillet have mentioned a land-tortoise as present in Egypt.

The Arabic name of the land-tortoise is سلحفا, or solhafa—pronounced, according to Mr. D. A. Cameron<sup>1</sup> and Dr. Walter Innes, *zihlifa*.

I am indebted to Dr. Keatinge for three photographic views of a land-tortoise, three living specimens of which he had purchased for the Museum of the Medical School at

<sup>1</sup> Arabic-English Vocabulary, 1892, p. 126.

Cairo. The species is *Testudo ibera*, Pallas, hitherto known only from North-west Africa, Syria, Asia Minor, Transcaucasia, and Persia. The native from whom they were bought informed Dr. Keatinge that he had got them from the Sudan, and that he had had them alive for more than fourteen years. There is no evidence that this tortoise occurs in Lower Egypt, but, like some other reptilian species, it may possibly range from Algeria and Tunisia to the Eastern Sudan, and, in view of this, I have thought it as well to record these specimens. The conjecture, however, that they, in all likelihood, were brought to Egypt from Syria is perhaps more probable than that they were of Sudanese origin. If this species does occur in the Sudan, it is likely to be distributed in the direction of Wádi Halfa and the plain of Suakin.

Rüppell<sup>1</sup> records that *Testudo calcarata*, Schneider, is present in the Province of Dongola, where it is known as "Abu Gefne."

Aristotle<sup>2</sup> relates a tale about the tortoise and the viper, the only interest of which is its parallelism to the myth prevalent in India regarding the cobra and the mungoose. As is well known, it is said that when a mungoose has been bitten by a cobra it searches for a particular plant which it eats, and that it serves as an antidote to the poison of the snake. Aristotle had heard that when a tortoise swallows a viper (which a tortoise never does, any more than does the mungoose eat the *manguswail*) it searches for and eats the origan or marjoram (to which it is probably partial at all times for its aromatic pungency), and he states that some one had mentioned the fact that he had seen a tortoise do so several times, but that at last when it was deprived of access to the *origan*, after having swallowed a viper, it died.

Wilkinson states that a tortoise-headed god occurs as one of the genii on the tombs, but he does not state on what tomb, and he adds that the tortoise was not one of the sacred animals of Egypt.

But, in the beginning of the Christian era, it seems as if some myth, probably cosmogonic, regarding this animal prevailed in the then Roman Province of Egypt, because while in Alexandria, in 1880, I was informed, on reliable authority, that when the obelisk was being taken down, for removal to New York, it was found resting on a small bronze figure of a tortoise. This obelisk, which had stood for ages at Heliopolis, had been removed thence and placed in front of the Cæsarium at Alexandria in the time of Tiberius. A fragment of a claw of the tortoise was presented to me, and I afterwards gave it to the Indian Museum, Calcutta<sup>3</sup>. An analysis of a portion of it proved it to be a true bronze.

<sup>1</sup> Neue Wirbelh., Amph. p. 4.

<sup>2</sup> Hist. An. iii. (1883), par M. J. Barthélemy St.-Hilaire, pp. 157-158.

<sup>3</sup> Anderson, Cat. & Hand-Book, Archæological Collection, pt. ii. 1883, p. 471.

## TRIONYCHIDÆ.

## TRIONYX.

*Trionyx, part.*, Geoffr. St.-Hil. Ann. Mus. xiv. 1809, p. 1.

## TRIONYX TRIUNGUIS, Forskål. (Plate III.)

*Le Trionyx d'Égypte*, Geoffroy St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, pp. 115-120, pl. i., et ed. 8vo (Panchouke), 1829, xxiv. Hist. Nat. vi. pp. 1-13, pl. i.

*Testudo triunguis*, Forskål, Descr. An. 1775, p. ix.

*Trionyx niloticus*, Gray, Syn. Rept. 1831, p. 46; Rüppell, Mus. Senck. iii. 1845, p. 298; Gray, Cat. Sh. Rept. i. 1855, p. 68, skull, pl. xlii. figs. 2 a-2 d.

*Trionyx ægyptiacus*, Geoffr. Ann. Mus. xiv. 1809, p. 12, pls. i. & ii.; Merrem, Syst. Amph. 1820, p. 20; Peters, Mon. Berl. Ak. 1862, p. 271; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) v. 1862, p. 175; id. op. cit. (vii. sér.) viii. 13, 1865, p. 126; Boettger, Ber. Senck. nat. Ges. 1879-80, 1880, p. 208; Tristram, West. Palestine, Rept. & Batr. 1884, p. 157.

*Gymnopus ægyptiacus*, Dum. & Bibr. ii. 1835, p. 484.

*Trionyx labiatus*, Bell, Test. 1837, pls. 18, 19, 20.

*Tyrse nilotica*, Gray, Cat. Tort. 1844, p. 48; Proc. Zool. Soc. 1864, p. 88; Petherick's Travels Cent. Afr. ii. 1869, Append. p. 189; Suppl. Cat. Sh. Rept. i. 1870, p. 108; Ann. & Mag. N. H. (4) xi. 1873, p. 470.

*Trionyx mortoni*, Hallow, Proc. Ac. Philad. ii. (1844) p. 120.

*Aspidonectes aspilus*, Cope, Proc. Ac. Philad. 1859, p. 295.

*Fordia africana*, Gray, Proc. Zool. Soc. 1869, p. 219; Petherick's Travels Cent. Afr. ii. 1869, Append. p. 190; Suppl. Cat. Sh. Rept. i. 1870, p. 100; Proc. Zool. Soc. 1873, p. 43, figs. 1 a-1 d.

*Trionyx triunguis*, Peters, Mon. Berl. Ak. 1876, p. 117; Blgr. Cat. Chelon. &c. 1889, p. 254; Anderson, Herpet. of Arabia & Egypt, 1896, p. 95; Blgr. Ann. Mus. Civ. Gen. ser. 2, xvii. (xxxvii.) 1896, p. 16; id. op. cit. p. 277.

1 ♀. Nile at Cairo. Dr. Walter Innes.

1 ♀ juv. Philæ.

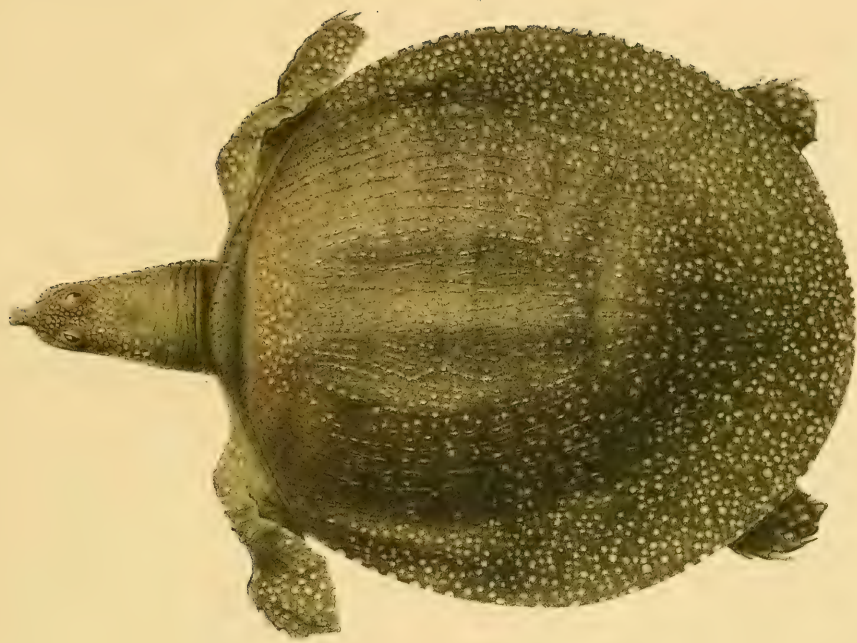
1 ♀ juv. Wādī Halfa. Major Henry d'Alton Harkness.

Carapace moderately convex, more or less depressed in the mesial line. Proboscis equalling the length of the eye. Upper labial folds and nuchal flaps well developed, the latter with rounded tubercles. Skin of the upper surface of the shell covered with tubercles arranged more or less in longitudinal wavy lines, most apparent in the young. Plastron with two pairs of callosities well developed in the adult and more or less rugose. Claws strong and pointed. Upper surface olive or olive-brown, profusely spotted with white dots with dark margins, well marked in the young and in half-grown





Fig. 1. ventral del. et lith.



TRIONYX TRIUNGUIS.  
juv. ♀. Wādi Hallā.



specimens, but obscure or obsolete in adults ; margin of fleshy disk yellowish ; under surface white, but the posterior margin of the fleshy disk marked with dusky.

It attains to a metre in length <sup>1</sup>.

Common in the Nile in Lower and Upper Egypt, and, according to James Burton <sup>2</sup>, present in the lakes in the Wádí Natrún. (<sup>3</sup> *Savoy, loc. cit.*, 1822, p. 100.)

In the month of April it deposits from 50 to 60 eggs on the sandbanks, where they are hatched by the heat of the sun.

The Arabs say that the Nile turtle searches for the eggs of the crocodile, and that it scratches them out of the sand and devours them. Maillet <sup>3</sup>, however, who was an excellent observer, did not credit the existence of this habit. Sonnini <sup>4</sup>, on the other hand, not only believed in it, but has stated that the turtle devoured the newly hatched young of the crocodile ; and James Burton <sup>5</sup> has recorded that it is not so much the ichneumon as the Nile turtle that destroys the young of the crocodile. This may be possible, but that so thoroughly an aquatic animal as a *Trionyx* should leave the water in search of food is highly improbable.

Fish and shell-fish appear to be its staple food, which it procures and devours under water.

Dr. J. E. Gray considered that the turtle of the Nile found in the reaches of the river at Khartoum was not only specifically, but generically distinct from the turtle of Lower Egypt, and he described it under the name of *Fordia africana*. His reasons for regarding it as generically distinct from *Trionyx* must unquestionably be rejected ; but at first sight the marked differences between the forms of the two skulls would seem to favour the supposition of their specific distinctness, whereas on the other hand the two animals, in external characters, are alike. Agassiz <sup>6</sup>, writing in 1857, held, however, that it was impossible to distinguish the species of *Trionychidæ* by their external characters, and that nothing short of a careful examination of their jaws, and especially of the skull, would reveal the generic characters.

The alveolar surfaces of the Khartoum turtle are characterized by great breadth, associated with a short, truncated, broad snout, whilst the same surfaces of the turtle of the Lower Nile are narrow and the snout is sharp and pointed.

Mr. Boulenger, who was the first to direct special attention to these extreme forms of jaws, points out that no young specimens of *Trionyx* have been met with in which the alveolar surfaces are broad and molar in their character, and that all young specimens have sharp and edged jaws. He holds that the two forms of alveolar surface are found

<sup>1</sup> Prospero Alpini (1553-1617) says, *Rerum Ægypt. lib. iv. cap. 2* (1735), p. 203, that it attains to such a size that the carapace was used for making shields, which is still the case in Nubia.

<sup>2</sup> Add. MSS. B.M. 25,623.

<sup>3</sup> *Descr. de l'Égypte*, 1735, p. 33\*.

<sup>4</sup> *L. c.* i. pp. 334, 335.

<sup>5</sup> *L. c.*

Contrib. to Nat. Hist. of U.S.A. 1857, 2 pls. 4to, p. 396.

in one and the same species, and he is inclined to explain the existence of a broad alveolar surface, in animals externally identical with those having a narrow surface, by the nature of their food. He maintains that a broad alveolar surface is associated with a conchifragous diet, and a narrow alveolar surface and sharp beak with an ichthyophagous diet; but, at the same time, Mr. Boulenger points out that the final solution of this most interesting problem rests with those who can observe the animals in nature. In view of this suggestion, it may be mentioned that there could be no better river for conducting such observations than the Nile, where the two types of skull are so well represented.

This species occurs in some of the rivers of Syria, throughout the Nile and its tributaries, and in the river systems of Africa, from Somaliland to Senegambia.

The Arabic name of this turtle is *ترسة*=terseh.

The turtle was not a sacred animal to the Egyptians, and the representations of it are rare. The conventional figure which Egyptologists regard as representing a tortoise seems to me rather to suggest a freshwater turtle. The body of the supposed chelonian hieroglyph is a depressed oval, and the neck is very long—two features which, while distinctive of the Nile turtle (*T. triunguis*), are in no way characteristic of any African land-tortoise. Figures of this kind are met with in the 'Book of the Dead,' and in a number of inscriptions, *e. g.* on the outside of the beautiful inner coffin of Nesi Pa-Ur Shef, of the XVIIIth Dynasty, preserved in the Fitzwilliam Museum, Cambridge<sup>1</sup>, and in an inscription at Kom Ombos reproduced by Rosellini<sup>2</sup>.

The cemeteries of the New Race of Men at Naquada and Ballas, already referred to, contained the body in a contracted position on the floor of the grave. Along with the body were stone vases and vessels of pottery of various kinds, that had doubtless contained food for the deceased. Before the face of each skeleton there generally lay a slate palette, and, in some cases, more than one. These slates bore greenish stains, and parts of them were worn into hollows. By their sides lay one to four smooth pebbles, also stained with the same colour, and, associated with them, were found shells and little bags filled with ground green malachite, and chips of the unground material. Professor Petrie and Mr. Quibell's explanation of their occurrence is that the new race had adopted the custom in vogue among the early Egyptians of painting the area around the eyes green. The interest attached to the discovery of these implements of the toilet from a zoological standpoint is that many of the palettes are fashioned in the form of the turtle of the Nile.

<sup>1</sup> Budge (E. A. W.), Cat. Egypt. Coll. 1893. Since the above was written, Dr. Budge has shown to me, on the inside of the coffin (No. 6678 B.M.) of Heru-net Atef, a priest of Amen Ra, dating from 500 to 350 B.C., two characteristic representations of the turtle.

<sup>2</sup> Mon. Egitto e della Nubia, 1832, vol. iii. pl. xxxix.



## SQUAMATA.

## LACERTILIA.

## GECKONIDÆ.

## STENODACTYLUS.

*Stenodactylus*, Fitzinger, Neue Class. Rept. 1826, p. 13.

Digits not dilated, straight, clawed, covered below with keeled scales, the central longitudinal row enlarged in the form of carinated lamellæ; sides of digits dentated or fringed. Body covered with juxtaposed, almost granular, scales, with or without intermixed large tubercles. Præanal pores present.

Before considering the species of *Stenodactylus* found in Egypt it is desirable to recall the nature of the scaling of the under surface of the digits. In *S. elegans*, Fitz., there is, *e. g.* on the third finger, a longitudinal row of 20 to 22, more or less tricarinate, slightly imbricate lamellæ, with a row of minute, serrately pointed scales external to it. The upper surface of one of the principal digits is covered at its middle with four or five scales, those of the external row being directed outwardly, and somewhat distally. This arrangement of the external dorsal scales confers a somewhat dentated appearance to the sides of the digits. In the species which I have named *S. petrii*, an additional longitudinal row of small scales occurs outside the lamellæ, *i. e.* external to the single row of the previous species, and the outer row of the dorsal scales becomes somewhat enlarged and projects as a fringe, most developed on the digits of the hind feet.

The under surfaces of the digits of *Ceramodactylus doriae*, Blanford<sup>1</sup>, are covered throughout the greater part of their extent by minute, uniformly sized, more or less imbricate scales arranged in oblique series but also longitudinally. Towards the distal ends of the digits they become fewer in number, and there is a tendency to the formation of a central row somewhat slightly larger than the scales external to it. In *C. affinis*, Murray, in which the scales on the under surface have much the same characters as in the former species, those occupying the mesial line of the digit manifest a perceptible increase in size over the others, so that they may be regarded as illustrating the passage of these scales into the well-defined central

<sup>1</sup> The genus *Holodactylus*, which Prof. Boettger (Zool. Anz. xvi. 1893, p. 113) regarded as a gecko and referred to the neighbourhood of *Ceramodactylus*, has been pointed out by Mr. Boulenger (Ann. & Mag. N. H. (ser. 6) xvi. Aug. 1895, p. 166) to be an Eublepharid. The figure which Messrs. Lucas and Frost have given of the under surface of the digits of *Ceramodactylus damæus*, L. & F. (Horn Exped. C. Australia, Feb. 1896, pp. 114 & 119, pl. ix. fig. 2, and Proc. Roy. Soc. Vict. viii. (n. s.) 1895, pp. 1-4), conclusively proves it not to be a *Ceramodactylus*, but possibly a *Diplodactylus*.

lamellæ of *Stenodactylus*, and, moreover, towards the tips of the digits, this passage is complete in the case of a few. I am therefore inclined to regard *Ceramodactylus* as only entitled to subgeneric rank.

One of the supposed features of *Stenodactylus* was the absence of præanal pores. They are, however, present in one of the types, and in 13 out of 19 males, and 10 out of 24 females, examined by me.

The simplest form of præanal pore is met with in *S. orientalis*, in which it occurs as a single opening in a slightly enlarged scale occupying the mesial line. In *S. elegans* two enlarged scales separated mesially by a considerable interval are perforated, each by a single opening.

Similar structures are present in *Ceramodactylus doriæ*, but in the single specimen of *C. affinis* that has come under my observation, viz. a female, there are no traces of pores. In *Crossobamon evermanni* there may be 3 or 4 pores, separated from one another in the mesial line, as in *S. elegans* and *C. doriæ*, but in the very limited number of specimens extant of *S. lumsdeni* and *S. petrii* they are not present.

In the genus *Bunopus*, which is allied to *Stenodactylus*, a line of enlarged scales extends from the præanal region for a considerable distance along the thighs. As many as thirty of these scales may carry pores, but not in a continuous line. In some specimens the pores may cease on the base of the thighs and appear again more distally, so that here we have an illustration of the passage of præanal into femoral pores. In *Alsophylax* there is a similar tendency, as in it there is a series of enlarged interfemoral scales bearing a relatively high number (9) of præanal pores. Although no pores occur on the thighs, the presence of enlarged scales suggests their occasional occurrence. I have, however, examined only three specimens of this genus.

The tail in *Stenodactylus* is modified in two ways: it is either thick, cylindrical, and tapered very gradually to a rather blunt point, or it may be somewhat broad at the base, rapidly contracted behind this, becoming somewhat filiform, and ending in a fine point. The enlarged tubercles at its base are always present, and are especially well developed in the latter form of tail, and most so in the males, so that it is almost possible to determine the sexes by the degree of its development.

A small gecko, with straight, non-dilated digits, covered below by more or less slightly imbricate, carinated, transverse lamellæ, the sides of the digits finely dentate, and the body clad with small, nearly polygonal, juxtaposed scales, is found throughout Egypt. It was first described by Lichtenstein in 1823, under the term *Ascalabotes sthenodactylus*<sup>1</sup>, and in these words: "*Asc. supra albo- et brunneo-ocellatus. 5". Aegypt. et Nubia.*" Fitzinger<sup>2</sup>, in 1826, selected it as the type of a new genus, which he

<sup>1</sup> Doubl. Zool. Mus. Berlin, 1823, p. 102.

<sup>2</sup> N. Class. Rept. 1826, p. 47.

named *Stenodactylus*, using the specific name for the generic term, and designating the species *S. elegans*. The following<sup>1</sup> is a figure of one of the types from the Berlin Museum.

Fig. 1.



*Stenodactylus elegans*, Fitzinger. ♀.

One of the types of *Ascalabotes sthenodactylus*, Licht., from Berlin Museum.

Baron Cuvier, in the new edition of the 'Règne Animal,' published in 1829, adopted the genus *Stenodactylus* and named the species *S. guttatus*, basing it on certain figures in the 'Description de l'Égypte.' One of these figures (plate v. fig. 2) is in every way so crude that it is impossible to gain from it any idea of what may have been the characters of the lizard which it was intended to represent. A second figure, however (Suppl. plate i. fig. 3) (not Suppl. plate i. fig. 2, as stated by Cuvier, which is *Ptyodactylus lobatus* = *P. hasselquistii*, Donndorff), he held represented the same species. This figure, taken as a whole, is a good likeness of *S. elegans*, Fitzinger, the *Asc. sthenodactylus*, Licht. The other figure on Suppl. plate i., viz. fig. 4, Cuvier regarded as a species distinct from *S. guttatus*, but allied to it.

The figure on which Cuvier based his *S. guttatus* (plate v. fig. 2) was described by Isidore Geoffroy St.-Hilaire as "*l'Agame ponctué*"<sup>2</sup>, and Duméril and Bibron state that the description of the latter author was drawn up from a very imperfectly executed coloured drawing.

While we learn nothing from pl. v. fig. 2, the figure (fig. 3) on Suppl. plate i. leaves no doubt as to the characters of Cuvier's *S. guttatus*, which is unquestionably identical with the *Ascalabotes sthenodactylus*, Licht.

<sup>1</sup> By the courtesy of Dr. Tornier, of the Berlin Museum, I have, by means of an exchange with that Institution, become possessed of one of Lichtenstein's types (figured above) preserved in its original bottle, and labelled "*Ascalabotes sthenodactylus*, Cuv., *Stenodactylus elegans*, Fitzinger; Nubia, Hemprich and Ehrenberg."

<sup>2</sup> Is. Geoffr. St.-Hilaire, in 1855, in a footnote to his introduction to the work entitled 'Voyage autour du Monde sur la Frégate Vénus,' gives 1827 as the date of his parts of the Reptiles and Fishes of the 'Description de l'Égypte.' Born 16th December, 1805, he was appointed assistant to his father in 1824.

When Audouin's part of the 'Description de l'Égypte' appeared<sup>1</sup>, it contained a description of the two figures (figs. 3 and 4) on Suppl. plate i. The former received from him the name *Trapelus savignyi*, while he regarded the latter as a variety of the same species.

If Audouin's text had been published before 1829, the year in which the new edition of the 'Règne Animal' appeared, it seems unlikely that Cuvier would have overlooked it, or intentionally ignored it; and as there is no reference by Audouin to Cuvier's 'Règne Animal,' the probability is that the portion of the 'Descr. de l'Égypte' written by Audouin was published about the same time as Cuvier's work.

The gecko (Suppl. pl. i. fig. 4) regarded by Audouin as a variety of *T. savignyi* is a distinct species, as pointed out by Cuvier, and is the species which I have recently described as *S. petrii* from specimens collected by Prof. Petrie at Tel el Amarna.

Duméril and Bibron considered all the foregoing figures in the 'Descr. de l'Égypte' as representing one species, but their illustration of *S. guttatus*, Cuvier, was taken from a specimen still preserved in the Paris Museum, and bearing the number 1765. Professor Vaillant has been so good as to permit me to examine this specimen, which, however, is not the lizard figured by Savigny on Suppl. pl. i. fig. 3, but is unmistakably identical with fig. 4 of the same plate—that is, with the lizard which Cuvier regarded as distinct from his *S. guttatus*, but which is specifically the same as *S. petrii*.

Gasco obtained two specimens of a *Stenodactylus* from near Cairo, and in his identification of them had been puzzled to reconcile them with Audouin's figures, being unaware that they represented two distinct species.

I have experienced considerable difficulty in arriving at a conclusion, satisfactory to myself, as to the position in which the geckos *S. wilkinsonii* and *S. mauritanicus* stand towards *S. elegans*. I have not been singular in this experience, as Mr. Boulenger, who at first regarded *S. wilkinsonii*<sup>2</sup> as a distinct species, afterwards considered it and *S. mauritanicus* to be specifically identical with *S. elegans*. He says<sup>3</sup>:—"The form that I regard as the typical *S. guttatus* has a moderately pointed snout, the dorsal granules are rather large, convex and coarsely granular, the rostral shield enters the

<sup>1</sup> On the 19th March, 1825, Corbière, the Minister Secretary of State for the Dept. of the Interior, addressed a letter to M. Jules-César Savigny requesting him to bring his part of the 'Descr. de l'Égypte' to an end. It is stated that at that time Savigny had supplied no part of the manuscript, nor even the whole of the drawings of his section of the work, and that he was unable to complete them, as he had lost his sight through his labours over the microscope. He was therefore desired to supply M. Victor Audouin, formerly one of his pupils, with such materials as he could furnish for the completion of the Natural History. From the evidence of contemporary literature it appears highly probable that Audouin's portion on the reptiles did not appear until 1829.

<sup>2</sup> Cat. Liz. B. M. i. 1885, p. 18.

<sup>3</sup> Trans. Zool. Soc. xiii. 1891, p. 108.



nostril, and the hind limb reaches barely the axil. Stouter specimens with shorter snout have been named *S. mauritanicus*. In Gray's *S. wilkinsonii* the snout is more pointed, the dorsal scales flat and subimbricate, the rostral is excluded from the nostril, and the hind limb reaches the shoulder. All these differences, however, break down, as specific characters, on examination of large series of specimens, and I do not even see my way to distinguishing the three forms as varieties. A specimen from Bou-Saada, collected by M. Lataste, has the short head and short limbs of *S. mauritanicus*; the dorsal scales very small, flattish, smooth, but not imbricate; and the nostril well separated from the rostral."

In 20 specimens collected at Gizeh, distinctly referable to *S. elegans*, Fitz., the fore limb generally reaches the snout, but in a few it may fall somewhat short of it, while in two specimens it is in advance of the snout when laid forwards. The hind limb when stretched forwards generally touches the axilla, or it may be a little before it, while in two out of the 20 it reaches the shoulder.

In the type of *S. wilkinsonii* the fore limb when laid forwards is in advance of the snout, and the hind limb reaches or nearly reaches the shoulder, and in these respects it is generally resembled by seven other specimens from Middle and Upper Egypt.

The fore limb in the type of *S. mauritanicus*<sup>1</sup> has the same proportions as is general among the Gizeh geckos, but in thirteen other specimens grouped along with it the fore limb, in three of them, is in advance of the snout. The hind limb of the type resembles that of the Gizeh geckos in reaching the axilla; but among four of the thirteen it falls short of the axilla, whereas in two it resembles the hind limb of *S. wilkinsonii* in reaching the shoulder.

No specimen among the Gizeh geckos has both its fore and hind limbs like those of *S. wilkinsonii*, neither in any of those grouped round *S. mauritanicus* are the limbs of the same length as in the aforementioned type; but in some of the Gizeh geckos their fore limbs are as long as in *S. wilkinsonii*, and in others their hind limbs may be so. In the same way, in some of the specimens grouped around *S. mauritanicus* we find short hind limbs associated with long fore limbs, and *vice versa*. Leaving other exceptional cases out of consideration, it may be said that the limbs of *S. mauritanicus* agree in their proportions with those of the Gizeh geckos.

In the type of *S. elegans*, stated to have come from Nubia, the fore limb has the length of the fore limb of *S. wilkinsonii*, while its hind limb falls short of that of the Gizeh geckos, and corresponds to the exceptionally short hind limbs of the *S. mauritanicus* group. I have consequently experienced some difficulty as to the position this

<sup>1</sup> I have to record my indebtedness to Professor Vaillant for having permitted me to examine the type of *S. mauritanicus*, Guichenot, preserved in the Paris Museum, and further for having forwarded another of the types (No. 2339, ♂) to London for my inspection, and for comparison with my Egyptian specimens of this genus.

specimen should occupy, but it evidently stands between the Gizeh geckos and those found in the delta and other localities, and that conform more or less to *S. mauritanicus*.

As regards the digits, those of the Gizeh geckos are not quite so slender as those of the type of *S. wilkinsonii* and of the geckos from Middle and Upper Egypt; but as variations in these respects are frequent, little or no importance need be attached to them. On the other hand, the digits of the type of *S. mauritanicus*, and of those associated with it, are generally stouter than in the others, and in some cases they are very markedly so (fig. 5, Pl. IV.), but other specimens have digits differing but little from those of *S. wilkinsonii*.

The nostril in the geckos found at the Pyramids of Gizeh is, without exception, defined by the rostral, first labial, and three nasals; but there are some cases in which the rostral feebly approaches the nostril, so that it is difficult to say whether or not it enters it. In the type of *S. wilkinsonii* the rostral is excluded, and the nasal formula is 1st labial, 3 nasals. This arrangement prevails among seven out of nine specimens which I have grouped along with *S. wilkinsonii*. In one of the nine the rostral enters on one side into the formation of the nostril, while in another specimen the nasal formula is R. L. 3 N. In this individual we have thus all the characters of the nostril of the Gizeh and Algerian geckos.

In the type of *S. elegans* (Nubia) the nostril is formed the same way as in the Gizeh geckos.

In the geckos around the Pyramids of Gizeh the upper labials vary from 10 to 14, and the lower from 9 to 12.

In *wilkinsonii*, on the other hand, the former are 14, and the latter 11, and in other specimens that may be associated with it the upper labials vary from 12 to 15, and the

Fig. 2.



*Stenodactylus elegans*, Fitz.

*S. mauritanicus*, Guichenot. Oran, Algeria (Professor Doumergue).

lower from 11 to 13. In the type of *S. elegans* there are 14 or 15 upper and 12 or 13 lower labials. In the type of *S. mauritanicus* there are 9 upper and 8 to 10 lower labials; and in a specimen from Oran there are 12 upper and 11 lower labials.

In specimens from the delta of Egypt and from the Eastern Sudan both the upper and the lower labials fall as low as 10 and rise to 13.

The gecko described by Guichenot as *mauritanicus* is more stoutly built than the Gizeh geckos, and its head is somewhat heavier and slightly broader, whereas the type of *S. wilkinsonii* in its general form resembles the Gizeh sand-geckos.

In the delta of the Nile, near the sea, geckos with the heavier body of *mauritanicus*, and with its short and stout limbs and digits, are present (Pl. IV. fig. 5); but at Luxor (fig. 3) individuals of this type occur, but with more slender limbs and digits, and with the nostrils of *wilkinsonii* (fig. 4). These seem to link the Algerian geckos to those of Gizeh. On the other hand, individuals are met with (fig. 6) in the Eastern Sudan (Durrur and Suakin) which must be regarded as intermediate between those of the Nile delta and those of Algeria.

It is noteworthy that the skin of the geckos of the Nile valley proper is not so coarse as that of those inhabiting Algeria and the seaward face of the delta, both of which areas are exposed to the storms of the Mediterranean; and that similar differences exist in the genus *Ptyodactylus*, in which Syrian and Algerian specimens have harder and coarser skins than those found in Egypt.

After a careful consideration of the foregoing facts in all their aspects, the safe conclusion seems to be that the specimens here dealt with are all referable to one species, viz. *S. elegans*, Fitz., as the variations they manifest are so unstable as to be beyond the reach of clear definition.

The gecko from Bou-Saada obtained by M. Lataste I consider to be identical with two specimens from Batna recorded by Strauch, and referred by him to *S. wilkinsonii*, Gray. Since 1885, the British Museum has become possessed of two geckos from between Batna and Biskra, identical with the specimen from Bou-Saada. Mr. Boulenger informs me that they were part of the same collection from which Strauch obtained his Batna lizards. On comparing them with Strauch's description of the Batna lizards, it is apparent that they are one and the same species, and quite distinct from *S. wilkinsonii*, Gray, = *S. elegans*, Fitz. I believe them to be identical with the species I have described as *S. petrii*. Consequently the two species exist side by side in Algeria, as they do on the plain of Tel el Amarna, in Egypt.

## STENODACTYLUS ELEGANS, Fitzinger. (Plate IV. figs. 1-6.)

*Ascalabotes sthenodactylus*, Licht. Verz. Doubl. Berl. Mus. 1823, p. 102.

*Stenodactylus elegans*, Fitzinger, Neue Class. Rept. 1826, p. 47; Anderson, Herpet. Arabia & Egypt, 1896, p. 95.

*Agame ponctué*, Is. Geoff. St.-Hil. Descr. de l'Égypte, i. ? 1827, pp. 129-130, pl. 5. fig. 2.

*Trapelus savignyi*, Aud. Descr. de l'Égypte, i. ? 1829, p. 167, suppl. pl. i. fig. 3, sed non fig. 4.

*Stenodactylus guttatus*, Cuv. Règ. An. (n. ed.) ii. 1829, p. 58; *part.*, Dum. & Bib. Herpet. Génl. iii.

1836, p. 434, *sed non* pl. 34. no. 2; Rüppell, Mus. Senck. iii. 1845, p. 301; *part.*, A. Dum.

Cat. Method. Rept. Paris Mus. 1851, p. 47; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. 1862,

p. 24; *part.*, id. op. cit. xxxv. 1887, p. 67; Peters, Mon. Berl. Ak. 1862, p. 271; Günther,

Proc. Zool. Soc. 1864, p. 489; Gasco, Viag. Egitto, 1876, pt. ii. p. 115; Bedriaga, Bull. Soc.

Imp. Nat. Mosc. liv. pt. 2, 1879, p. 35; Boettger, Ber. Senck. nat. Gesel. 1880, p. 194;

Tristram, West. Palest., Rept. & Batr. 1884, p. 153; Boulenger, Cat. Liz. B. M. i. 1885, p. 17;

Trans. Zool. Soc. xiii. 1891, p. 107; Proc. Zool. Soc. 1896, p. 213; Ann. Mus. Civ. Genova,

2 ser. xvii. (xxxvii.) 1897, p. 277; Hart, Fauna and Flora of Sinai, 1891, p. 210; *part.*,

Werner, Verh. zool.-bot. Ges. Wien, 1894, p. 76.

*Tolarenta wilkinsonii*, Gray, Zool. Misc. 1842, p. 59; Blgr. Cat. Liz. B. M. 1885, p. 18, pl. iii. fig. 3\*.

*Stenodactylus mauritanicus*, Guichenot, Explor. Algér., Sc. Phys., Zool. v. 1850, p. 5, pl. 1. fig. 1;

Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. 1862, p. 25.

*Stenodactylus guttatus*, var. *mauritanica*, Peters, Mon. Berl. Ak. 1880, p. 306.

1 ♂. Mandara, east of Alexandria. Dr. Walter Innes.

4 ♂ and 1 ♀. Ramleh, east of Alexandria.

8 ♂ and 12 ♀. Pyramids of Gizeh.

3 ♀. Tel el Amarna. Professor Petrie, D.C.L. &c.

3 ♂ and 1 ♀. Luxor, desert.

1 ♂. Wádi Halfa. Surgeon-Captain R. H. Penton, D.S.O.

1 ♂ and 1 ♀. Suakin.

2 ♀. Durrur.

1 ♂. Ras Gharib, Gulf of Suez. Mr. James Robertson.

Head oviform, moderately large, larger in some than in others, distinct from the neck; cheeks not swollen; snout moderately pointed, as long as the diameter of the eye, but variable; nostril more or less swollen, generally formed by the rostral, first labial, and three nasals, but occasionally <sup>translucent</sup> the rostral may be partially or wholly excluded; 9 to 15 upper and 8 to 15 lower labials; mental small, as broad as long. Eye large; ear oval, oblique, considerably smaller than half the diameter of the eye. Body-scales small, rounded, flat, or slightly convex, juxtaposed, smooth or more or less feebly keeled, those on the snout larger than those on the occiput, more or less hexagonal, granular, and generally obscurely keeled. Scales on the limbs but little larger than those on the body, tending to become subimbricate; scales on the under surface of the body smaller than the dorsal scales, nearly round, granular, and obtusely keeled.





P.J. Smit del. et lith.

*STENODACTYLUS ELEGANS*. Fig. 1 ♀, Gizeh; Fig. 2 ♂ & Fig. 3 ♀, Luxor; Fig. 4 ♀, Tel el Amarna; Fig. 5 ♀, Ramleh; Fig. 6 ♀, Durrur.

*STENODACTYLUS PETRII*. Fig. 7, Tel el Amarna.

*TROPIOCOLOTES TRIPOLITANUS*. Fig. 8, Gizeh.

*TROPIOCOLOTES STEUDNERI*. Fig. 9, Luxor.

*PRISTURUS FLAVIPUNCTATUS*. Fig. 10 ♂, Suakin.



Under surface of the digits with a longitudinal line of transverse, tricarinate, subimbriate lamellæ, with a single row of small scales external to it; four to six rows of scales on the upper surface of the digits (3rd toe), the scales of the external row sharply pointed, projecting outwards, and forming a dentated border to the digits. Scales on the tail arranged in rings, largest on the dorsal surface, somewhat longer than broad, juxtaposed, and smooth, those on the under surface smaller. Limbs well developed, very variable in length, fore limb extending to or reaching beyond the snout, or falling short of it; the hind limb generally reaches to the axilla, may fall short of it, or may touch the shoulder; digits variable, longer and stouter in some than in others. Tail thick, not contracted behind the base, elongately conical, gradually tapered to a not very fine point, shorter than the body and head.

Colour variable, frequently fawn or rich buff, reticulated with purplish brown, varying in tint, the reticulations enclosing whitish or yellow spots; in others the upper surface is an almost uniform purplish brown, with feebly indicated darker reticulations, sometimes almost wholly lost, embracing small whitish or yellowish round spots, numerous in some, nearly absent in others; the body may also be covered with five broad purplish-brown more or less white-spotted bands, separated from each other by reticulated areas, the sides and limbs being white-spotted; a dark band, more or less present in many, passes from eye to eye round the occiput; the dorsal bands in others become broken up into large purplish-brown spots surrounded by reticulations and white spots; generally 8 to 10 purplish-brown bands on the tail, separated from each other by a large white black-margined spot, these spots becoming white bars towards the tip of the tail, but in some these white spots are entirely obsolete. Under surface of the body and limbs whitish, of the tail yellowish. The eyelid, anteriorly, has a rich white margin; the rugged and jagged sides of the pupil are bright yellow.

The largest Egyptian specimen is a female, measuring 54 millim. from the snout to the vent, and the tail 40 millim.

All the specimens of this gecko from the neighbourhood of the Pyramids of Gizeh were obtained on the margin of the desert, lying under stones resting on sand and gravel, and those from the sea-face of the delta (Ramleh and Mandara) were found under similar conditions but close to the sea. I never met with it running about. It may be said to be common at Gizeh, but less so along the sea-face.

It has a wide range over Northern and North-eastern Africa, and extends into Asia.

In Algeria it has been observed in many localities. I found it not uncommon at Suakin on the shores of the Red Sea, and I have received specimens from Durrur and from Ras Gharîb. It has likewise recently been obtained from the banks of Lake Rudolf (*Donaldson Smith*). How far it may extend to the south, along the Nile valley, is unknown, but one of Hemprich and Ehrenberg's specimens (fig. 1, p. 37) came from Nubia, and I am indebted to Dr. Penton for examples of it from Wâdî Halfa. It occurs on the Mediterranean coast at Yâfa (*Boulenger*), and inland on the shores of

the Dead Sea (*Tristram*), in Arabia Petræa (*Frankfort Museum*), and the Sinaitic Peninsula (*Hart*).

In Plate IV. I have figured some of the more marked phases of this lizard in the region with which this work deals. Figure 1 represents the Gizeh lizards; figs. 2 & 3 are specimens from Luxor; fig. 4 from Tel el Amarna; fig. 5 from Ramleh, on the sea-face of the delta; and fig. 6 from Durrur. To these I am enabled to add the following figure of the specimen collected by Dr. Donaldson Smith on the shores of Lake Rudolf, Mr. Boulenger having kindly placed the specimen at my disposal for this purpose.

Fig. 3.



*Stenodactylus elegans*, Fitz.  
Lake Rudolf. (Genoa Museum.)

A comparison of the foregoing figure with fig. 2, Pl. IV., will bring out their close resemblance—indeed practical identity,—the only difference between them being that the Lake Rudolf specimen has a smaller head, as has been pointed out by Mr. Boulenger.

Dr. Walter Innes informs me that the Arabs have only one name for lizards of the genera *Stenodactylus* and *Tropicolotes*, viz. *بورس أبيض* = *bors abyad*, or white *bors*; but, according to my experience, the term *abyad* is seldom used.



## STENODACTYLUS PETRII, Anderson. (Plate IV. fig. 7.)

*Trapelus savignyi*, Aud. var. (*non* Dum. & Bibr.) Descr. de l'Égypte, i. 1829, p. 168; Suppl. Rept. pl. i. figs. 4. 1, 4. 2, and 4. 3, *sed non* Suppl. Rept. pl. i. figs. 3. 1, 3. 2, and 3. 3.

*Stenodactylus guttatus*, part., Dum. & Bibr. iii. (1836), p. 434, pl. 34. no. 2.

*Stenodactylus wilkinsonii* (*non* Gray), Strauch, Mém. Ac. St. Pétersb. (vii. sér.) xxxv. 1887, p. 67.

*Stenodactylus guttatus*, part., Blgr. Trans. Zool. Soc. xiii. 1891, p. 107; ? Werner, Verh. zool.-bot. Ges. Wien, xlv. 1895, p. 76.

*Stenodactylus petrii*, Anders. Herpet. Arabia & Egypt, 1896, p. 96.

1 ♂ and 2 ♀. Tel el Amarna. Professor W. M. Flinders Petrie, D.C.L.

Head large, very distinct from the neck; cheeks swollen; snout short and moderately pointed, equalling the diameter of the eye; nostril swollen, defined by the first labial and three nasals; 12 to 15 upper and 11 to 14 lower labials; mental well developed, much broader than long. Eye very large; ear moderate, slightly oval and vertical. Body covered with small, smooth, slightly convex scales, generally longer than broad, polygonal and somewhat smaller on the middle of the back than on the sides, where they are more rounded; they are largest on the snout, hexagonal, very slightly convex and rugose; scales on the limbs as large as those on the sides, tending to become imbricate and feebly keeled on the humeral and femoral regions; scales on the under surface of the body slightly imbricate, obscurely obtusely keeled. Under surface of the digits with a longitudinal row of transverse tricarinate lamellæ, more or less imbricate, with two rows of small, distinctly pointed scales external to it; five or seven rows of scales on the upper surface of the third toe, about its middle; the outer row of dorsal scales of each digit forms a well-marked but not very prominent fringe most developed on the hind foot, each scale being expanded at its base and curved distally into a sharp point, the entire fringe being slightly downwardly curved. Scales on the tail arranged in rings, largest on the upper surface, somewhat larger than the largest body-scales, longer than broad, and more or less keeled; those of the under surface much smaller and rounded. Limbs long and slender; fore limb when laid forwards reaches beyond the snout, and the hind limb in advance of the shoulder. Digits moderately long and slender. Tail contracted behind the basal swelling, rapidly tapered to a fine point, shorter than the body and head. No præanal pores, and no enlarged scales on the position occupied by these structures.

General colour of the upper parts pale but rich fawn, with irregular dark brown markings, most pronounced on the head, feeble on the upper surface of the trunk, and tending to anastomose; the most pronounced head-marking occurs behind the eye, and curving inwards tends to unite with its fellow of the opposite side; an ill-defined

pale brown band from the ear along the side; tail banded to its tip with dark brown; chin to vent and sides of belly whitish; under surface of limbs and tail yellowish.

	♀. mm.	♂. mm.
Snout to vent .....	60	54
Length of head.....	18	18
Width of head .....	14	14
Vent to tip of tail.....	53	51

This species differs from *S. elegans* by the characters indicated in the subjoined synopsis of the species. It has decided affinities to *Crossobamon eversmanni*, Boettger.

Nothing is known regarding its habits. The specimens were collected for me by Professor Petrie, while he and his staff were engaged excavating on the plain of Tel el Amarna.

As has already been stated, it has been found at Bou-Saada, in Algeria, close on 2000 feet above the sea; at Batna (3350 feet), and also between Batna and Biskra. The latter place, on the margin of the Sahara, stands only 360 feet above the sea, and the oasis of Tuggurt, at about the same altitude, is distant only 136 miles due south. I am further indebted to the courtesy of Mr. Boulenger for the opportunity of examining a specimen of this species collected by M. Lataste at Mäirer, on the way between Biskra and Tuggurt. Moreover, Dr. Franz Werner's description of the *Stenodactylus* obtained by him between Mäirer and Tuggurt suggests the probability that it also is this species.

The only other example that I have seen is the one from Egypt, preserved in the Paris Museum, and figured by Duméril and Bibron.

The following is a synopsis of the species:—

*Synopsis of the Species.*

A. No enlarged tubercles on the body.

1. Scales on the body of nearly uniform size, not smaller on the middle of the back; digits with fine lateral denticulations; tail elongately conical, not tapered to a fine point. . . . . *S. elegans.*
2. Scales on the body not of uniform size, smallest on the middle of the back; tail broad at the base, contracted behind it, and tapered to a fine point.  
Limbs and digits slender; digits distinctly fringed . . . . . *S. petrii.*

B. Enlarged tubercles on the body; digits fringed.

- a. Ventrals smooth, imbricate . . . . . *S. lumsdeni.* <sup>B</sup>
- b. Ventrals keeled, granular . . . . . *S. orientalis.*

## TROIPOCOLOTES.

*Tropiocolotes*, Peters, Mon. Berl. Ak. 1880, p. 306.

Digits slightly laterally compressed, straight, not dilated, covered below with ribbed or keeled, slightly imbricate, transverse lamellæ; no lateral fringe. Body covered above and below with imbricate, strongly keeled, or nearly smooth scales. Lower eyelid rudimentary, upper feebly developed; pupil <sup>head size</sup> round. Large chin-shields. Præ-anal pores present or absent; no femoral pores.

The transverse lamellæ besides being slightly imbricate have their free margins somewhat dentate. Twelve to thirteen lamellæ are present on the second and third toes of *T. tripolitanus*, and fifteen to twenty on the corresponding digits of *T. steudneri*. External to each lamella there is a small leaf-like scale, and over the dorsum of each digit there are generally four or five oval, imbricate, somewhat pectinate scales.

## TROIPOCOLOTES TRIPOLITANUS, Peters. (Plate IV. fig. 8.)

*Tropiocolotes tripolitanus*, Peters, Mon. Berl. Ak. 1880, p. 306, pl. —. fig. 1; Blgr. Trans. Zool.

Soc. xiii. 1891, p. 108; Anderson, Herpet. Arabia & Egypt, 1896, p. 97.

*Stenodactylus tripolitanus*, Blgr. Cat. Liz. B. M. i. 1885, p. 19.

6 specimens from around the Pyramids of Gizeh, under stones.

Head oval, nearly flat above; snout exceeding the distance between the posterior border of the eye and the ear, somewhat pointed; eye two-thirds of the length of the snout; ear small, round, less than one-third the diameter of the eye, slightly below the level of the commissure of the mouth; nostril defined anteriorly by the rostral, below by the first labial, and posteriorly and superiorly by two small, scale-like nasals; rostral with a deep groove on its upper surface; 7 to 9 upper, and 6 or 7 lower labials, those below the eye very small; mental triangular, as broad as the rostral, with one pair of large chin-shields behind it, in contact with one another, with the mental, two labials, and with some small plates, larger than the neighbouring granules lying along their hinder borders. The fore limb when laid forwards reaches to the middle of the snout, and the hind limb to the axilla. Digits moderately long, very slightly compressed. Claws feeble, curved. Tail exceeds the distance between the snout and the vent by nearly one half; it is thick, cylindrical, and tapers to a point. The scales on the side and upper surface of the snout are juxtaposed and feebly keeled, and those on the temporal region are small and strongly keeled. The dorsal scales and those on the limbs and on the upper and under surface of the tail are of moderate size, more or less

cycloid, imbricate, and strongly keeled, the keels being arranged in continuous ridges. On the under surface of the head the scales are finely granular, but on the rest of the under surface of the body they are imbricate and strongly keeled in lines; those of the middle of the belly are about one half the size of the scales of the back. About 50 rows of scales round the middle of the body. No præanal pores.

General colour of the upper surface pale yellowish, speckled with fine dark brown dots and some obscure white spots. A well-marked dark brown band runs from the nostril to the eye, and is continued above the ear to the shoulder. Upper surface of tail in its first third coloured like the back, but beyond this with broadish brown transverse bars, about 16 in number in a perfect tail. Upper surface of limbs concolorous with the back; under surface nearly white.

Snout to vent 35 millim.; tail 49. Total length 84 millim.

Among loose sand and pebbles, under stones, around the Pyramids of Gizeh.

This species was first discovered in Tripoli by Drs. Rohlf and Stecker on their journey to the oasis of Kufra. Since then it has been found in four localities in Tunisia.

It was unknown in Egypt until I found it in the locality already indicated. It would be interesting to know what its distribution is in Egypt, and whether it occurs on the right as well as on the left bank of the Nile like the next species.

#### TROPICOLOTES STEUDNERI, Peters. (Plate IV. fig. 9.)

*Gymnodactylus steudneri*, Peters, Mon. Berl. Ak. 1869, p. 788; Gasco, Viaggio in Egitto, pt. ii. 1876, p. 113; Blgr. Cat. Liz. B. M. i. 1885, p. 34.

*Stenodactylus petersii*, Blgr. op. cit. i. p. 18, pl. iii. fig. 4.

*Stenodactylus steudneri*, Blgr. op. cit. iii. 1887, p. 480.

*Tropicolotes steudneri*, Blgr. Trans. Zool. Soc. xiii. 1891, p. 108; Anderson, Herpet. Arabia & Egypt, 1896, p. 97.

1. Neighbourhood of the Pyramids of Gizeh, under stones.

15. Margin of desert, Luxor; dug out of small holes.

1. Desert of Philæ.

Head elongately oval, rather flat above; snout exceeding the distance between the posterior border of the eye and the ear; diameter of the eye about two-thirds the length of the snout; ear very small, less than one-third the diameter of the eye, situated slightly below the level of the angle of the mouth; nostril defined by the rostral anteriorly, below by the first labial, and above and posteriorly by two scale-like nasals; rostral traversed by a longitudinal groove; 7 to 9 upper and 6 lower labials; mental as broad as the rostral, with a pair of shields behind it, in contact with one another, and with a smaller shield behind each of them. Limbs moderately long, the fore limb reaching before the eye or to halfway between the eye and the snout, and the



hind limb nearly reaching the axilla. Digits moderately long and slightly compressed; claws feeble, slightly curved. The tail exceeds the distance between the snout and the vent by nearly half of its length; it is cylindrical and tapers to a very filiform point. Scales on the head granular, rounded, and more or less conical, considerably larger on the snout, polygonal and smooth. Scales on the temporal region small, conical, smooth. Scales on the body and limbs imbricate, somewhat cycloid, smooth, or very faintly keeled in places; those on the tail larger than those on the back, and more or less keeled above and below towards its end. Scales on the under surface of the head finely granular; those on the ventral surface of the trunk about the same size as the dorsal scales, imbricate and smooth. About 50 scales round the middle of the body. Two præanal pores present.

Buff or brownish, with dark brown spots tending to form transverse bands, with pale spots between them; in some the bands are obsolete and the back is brown-spotted. A dark brown band from the nostril to the eye and behind the latter. Tail barred with brown and yellowish buff. Underparts white.

Snout to vent 28 millim.; tail 39 millim.

The type of this species was collected by Steudner at Sennaar and described by Peters, in 1869. In 1846, the British Museum purchased a specimen which was said to have come from Egypt. Gasco, in 1876, recorded that he had obtained four individuals from near Cairo.

I first met with it at the Pyramids of Gizeh, but only obtained a single specimen, after a careful and extended search for more. It would thus appear to be rare in that locality. But on the margin of the desert, some miles to the north-east of Luxor, I found it to be so plentiful in one place that I obtained fifteen specimens in a very short time, and observed many others. I first came upon it in digging into a hole to which an *Eremias guttulata* had retreated; and this led me to look for it in other holes, with the success I have mentioned. It is quick in its movements, and from its small size, and the similarity of its colouring to the ground it frequents, it is very difficult to capture.

## BUNOPUS.

*Bunopus*, Blanford, Ann. Mag. N. H. (4) xiii. 1874, p. 454.

Digits straight, slender, not dilated, covered below with tubercularly swollen, transverse lamellæ. Body-scales above granular, with enlarged tubercles; ventral scales imbricate. Pupil vertical. Tail verticillate. Præanal pores.

## BUNOPUS BLANFORDII, Strauch. (Fig. 4.)

*Bunopus blanfordii*, Strauch, Mém. Acad. St. Pétersb. (vii. sér.) xxxv. 1887, p. 61, pl. figs. 13 & 14; Anderson, Herpet. Arabia & Egypt, 1896, pp. 21, 111.

Body somewhat slender and slightly depressed; head elongately oval; snout rather long, pointed and spatulate; nostril formed by the rostral, first labial, and three nasals; ear an elongately oval, vertical slit. Upper and lower labials variable, 10 or 11 of the former, and 9 or 10 of the latter; a few enlarged granules behind the mental and along the lower labials. Fore limb reaching to the snout or falling slightly short of it, not reaching the groin; hind limb reaching to the axilla or to the shoulder. Transverse lamellæ of digits dentate at their free borders, which are more or less swollen, feebly bitubercular, and projecting in profile. Body covered with small, unequal, subimbricate, almost granular scales, with numerous large trihedral tubercles, some smaller than others, scattered among them and arranged somewhat in 14 longitudinal rows. Scales on the snout generally hexagonal, more or less convex, largest before the eyes; from between the eyes backwards to the occiput the head is sparsely covered with minute granules, with numerous rounded, smooth, convex tubercles, some larger than the others, largest on the occipital and temporal regions; a few large ones at the angle of the mouth, and 2 or 3 at the anterior border of the ear. The tubercles of the occiput, as they are traced backwards, pass gradually into the large trihedral tubercles of the back. The humerus with some large keeled scales and a few enlarged tubercles, the latter also present among the scales on the hind limb. The scales on the under surface of the head are small granules, gradually increasing in size backwards towards the lower part of the abdomen, where they are about one-fourth the size of the largest dorsal tubercles; on the chest and backwards they are feebly imbricate, somewhat cycloid with finely dentate free ends, more or less carinate on the chest, but less so posteriorly, where they may be smooth or obscurely keeled. A line of enlarged scales across the præanal region and prolonged on to the thighs; præanal and femoral pores present in the males, the latter seldom extending beyond the middle of the thigh, but in others occurring interruptedly along the thigh for a considerable part of its extent; 10 to 20 pores in continuous series on the præanal area, and as many as

31 in interrupted series on præanal region and thighs, but many on the thighs not well defined. Tail slightly depressed at the base, cylindrical beyond, fully one-third longer than the body and head; scales on its upper surface arranged in well-marked verticils, defined posteriorly by enlarged carinate tubercles, each verticil consisting of about four rows of unequal scales, somewhat obtusely keeled. Under surface with rings of unequal, keeled scales, two or more larger scales, side by side, corresponding to the posterior border of the verticils.

Rufous ashy above, with broad, brownish, transverse dorsal bands, somewhat irregular in form, and varying in intensity, or paler above without the bands, but with brownish spots of varying size, and more or less longitudinal in their arrangement, in five or six lines, or the spots when small more or less irregular in their distribution. Upper surface of head with similarly coloured spots, or immaculate; a brown band before the eyes to the snout, varying in breadth and intensity, and prolonged behind the eyes and tending to be continued to the occiput. Limbs with a few obscure brown bars or spots. Tail barred above with brown. Under surface of body, limbs, and tail white.

Strauch's largest specimen measured—snout to vent 41 millim., tail 42 millim.; but the measurements of a male from the Hadramut with a perfect unrenewed tail were as follows—snout to vent 49 millim., tail 63 millim.

I have never met with this species myself in Egypt. It was described by Strauch from two specimens said to have come from Egypt, and to have formed part of the collection of a Prince of Würtemberg. They were forwarded to Strauch by Erber, under the name of *Gymnodactylus scaber*, to which the species has a superficial resemblance. As recorded elsewhere, I am indebted to Professor Pleske for having kindly forwarded one of the types to London for my inspection, and of this specimen I now give the accompanying figure (fig. 4).

No other specimens of this species have been recorded from Egypt, but my collector, who accompanied Mr. Bent to the Hadramut, brought back fifteen examples of it, which were compared with the type from St. Petersburg. Egypt and the Hadramut are therefore the only two regions in which it has been observed.

Its habits are probably the same as those of *B. tuberculatus*, which Mr. Blanford states is "found in houses and under stones"<sup>1</sup>. It is closely allied to that species, but differs from it in the body and limbs being more slender, the head more flattened, the snout longer, in the absence of chin-shields, in the enlarged dorsal tubercles being more numerous, and in the presence of elongate scales on the under surface of the tail, corresponding to the verticils.

*B. tuberculatus* is confined to Asia. According to Mr. Blanford it abounds in Baluchistan, but it is also present in Sind, in South-eastern Persia, and on the coasts of the Persian Gulf.

<sup>1</sup> Zool. of Persia, 1876, p. 350.

In *B. tuberculatus* the under surface of the digits is covered with broad, but slightly, if at all, imbricate, transverse plates, more or less swollen into eminences. A small somewhat tumid scale lies along either side of the lamellæ, and the upper surface of the digits is covered with imbricate scales, the outermost row of which has the points of the scales directed forwards and outwards, so that when the digits are viewed from

Fig. 4.



*Bunopus blanfordii*, Strauch. One of the types, St. Petersburg Museum.

below, the points of these scales are seen slightly to project, but not to the extent to entitle them to be regarded as a denticulation.

In *Alsophylax pipiens* there is much the same structure, as there are the transverse plates and the row of small scales external to them; but the former are simple, *i. e.* without eminences. In *Stenodactylus elegans* the lamellæ are tricarinate, and the small row of scales external to them is better developed than in either *Bunopus* or *Alsophylax*; and the side of the digit is distinctly dentate, owing to the greater development of the row of scales external to the line that runs along the side of the lamellæ, and which I regard as the outer row of dorsal scales of the digit. *S. lumsdeni* has the similarly dentate digits of *S. elegans*, whereas in *S. orientalis* the dentations become converted into a fringe. In *S. petrii* there is an additional row of small scales external to the



lamellæ, and the latero-dorsal row of scales assumes the form of a fringe, more developed in the latter than in the former. In *Crossobamon* there is practically the same structure of digit as in *S. petrii*, but the fringe becomes so greatly developed as to recall the fringe of an *Acanthodactylus*. It is thus evident that the digits of these supposed genera do not differ very materially from one another.

In *Bunopus* the nostril is defined by the rostral, first labial, and three nasals, and the development of these scales is much the same as in *Stenodactylus*; whereas in *Alsophylax* the first labial is very large and defines not only the lower, but the posterior border of the nostril as well, thus differing materially from the very limited relation of that shield to the nostril in *Bunopus*. In *Alsophylax* also there is a well-developed upper nasal shield, quite unlike the scaly nasals of the latter genus. Also the tail of *Alsophylax* instead of being in verticils defined by enlarged tubercles is non-verticillate and covered with smooth imbricate scales.

## GYMNODACTYLUS.

*Gymnodactylus*, Spix, Spec. nov. Lacert. Bras. 1825, p. 17.

Digits slender, not dilated, covered below with more or less developed transverse plates; proximal portion of the digits cylindrical or slightly depressed, the distal section composed of two or three compressed phalanges set at an angle to the proximal portion; each digit with a claw bearing an enlarged scale above and another under its base. Scales on the upper surface of the body variable, either granules or scales, with or without enlarged tubercles; ventrals granular or scaly. Tail generally cylindrical, and, exceptionally, short and broad. Pupil vertical. Præanal pores present or absent in the male.

## GYMNODACTYLUS SCABER, Heyden. (Plate V. fig. 1.)

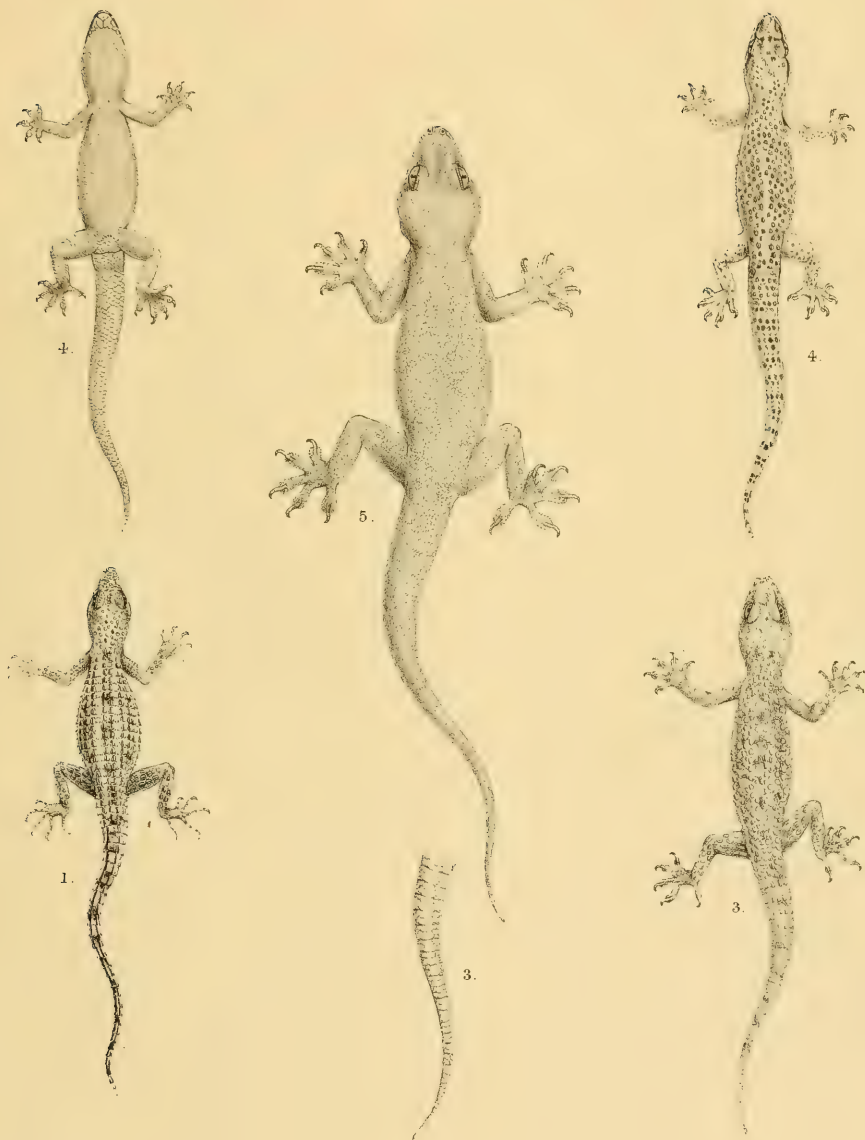
*Stenodactylus scaber*, Heyden, Rüppell, Atlas nördl. Afr., Rept. 1827, p. 15, pl. iv. fig. 2.

*Gymnodactylus scaber*, *part.*, D. & B. iii. 1836, p. 421; Peters, Mon. Berl. Ak. 1862, p. 271; Gasco, Viaggio in Egitto, pt. ii. 1876, p. 113; Klunzinger, Zeitschr. Ges. Erdk. Berl. xiii. 1878, p. 94; Murray, Ann. & Mag. N. H. (5) xiv. 1884, p. 102; Blgr. Cat. Liz. B. M. i. 1885, p. 27; Fauna of Brit. India, Rept. & Batr. 1890, p. 62; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) xxxv. no. 2, 1887, p. 47; Boettger, Offenb. Ver. Nat. 1892, p. 62; Kat. Rept. Mus. Senck. 1893, p. 22; Werner, Verh. zool.-bot. Ges. Wien, xlv. 1895, p. 13; Anderson, Herpet. Arabia & Egypt, 1896, p. 112.

*Gonyodactylus* (*Cryptopodion*) *scaber*, Fitz. Syst. Rept. 1843, p. 93.

*Gymnodactylus geckoides* (*non* Spix), Schreib. Herp. Eur. 1875, p. 482; Blanford, Zool. Persia, 1876, p. 348; *part.*, Steindachner, Novara Reptiles, 1876, p. 17.

Head of moderate size; forehead slightly concave; eye large; ear small, narrow, vertical in position; nostril formed by the rostral, first labial, and three nasals. Body of moderate length, not depressed; limbs well developed, the fore limb reaching to the tip of the snout, and the hind limb to near the ear. Rostral with a median groove above; generally ten upper, and eight or nine lower labials; mental triangular, with two pairs of chin-shields behind it, the inner pair forming a suture behind the mental. The snout covered with rather large, more or less polygonal, convex granules, and the back of the head with granules and intermixed rounded tubercles. Scales of the upper surface of the body small, irregular, and flat, with numerous, closely intermixed, large, strongly-keeled, trihedral tubercles, each much larger than the surrounding areas occupied by the small scales, and arranged in 12 to 14 more or less longitudinal lines. Scales on the under surface of the body in about 20 longitudinal rows across the middle of the belly, large, smooth, and more or less cycloid in form. Tail longer than the body and head, somewhat depressed at the base, cylindrical beyond this, and tapered



J. Green del. et lith.

GYMNODACTYLUS SCABER. Fig. 1, ♀, Fao, Persian Gulf.

HEMIDACTYLUS TURCICUS, var. SINAITA. Fig. 2, ♀, Suakin.

HEMIDACTYLUS TURCICUS. Fig. 3, ♀, Edfu.

HEMIDACTYLUS FLAVIVIRIDIS. Fig. 5, ♂, Suakin.





to the tip; covered above with large projecting pointed tubercles; under surface with transversely enlarged plates. Five to six præanal pores in the male. Pale sandy-coloured above, spotted with brown, and the tail with rings of the same colour; underparts white.

The largest specimen in the British Museum has the following measurements:—Snout to vent 46; tail 59 millim.

I did not meet with *G. scaber* myself, but Gasco found a small lizard near Cairo which he referred to this species. A specimen is also preserved in the St. Petersburg Museum, said to have come from Cairo. The first authentic record of its occurrence in Egypt was given by Peters in 1862; but as far back as Duméril and Bibron's day a specimen from Egypt, said to have been presented by Rüppell, existed in the Paris Museum.

It was first described by Heyden, who gave "stony places, Tor, Arabia, and Abyssinian coast," as the localities whence his specimens were obtained; but neither Rüppell nor Prof. Boettger make any mention in their catalogues of specimens from Abyssinia.

Dr. Klunzinger, in 1872, obtained 3 specimens at Kosseir<sup>1</sup>.

Outside of Africa it ranges through Arabia to Mesopotamia (Baghdad and Fao), through Persia (Shiraz, Bandar Abbas), to Afghanistan (Kandahar) and Sind (Sukkur and Saki).

The native name is بَرَص = *bors*.

<sup>1</sup> I tried to make Kosseir a centre for collecting, as it is a coastguard station of the Egyptian Government under the supervision of Europeans. With official sanction I forwarded to the station a liberal supply of alcohol for collecting purposes, on two occasions, accompanied by full instructions as to how the collections were to be made, while at the same time I offered pecuniary rewards for each specimen to be obtained. I received most encouraging promises in return, but beyond that nothing more. This was in such marked contrast to my experience in every other quarter in Egypt that I cannot refrain from mentioning it, as it explains how Kosseir happens not to be represented in my collections.

## PRISTURUS.

*Pristurus*, Rüppell, N. Wirbelth. Faun. Abyss., Rept. 1835, p. 16.

"Digits slender, clawed, cylindrical at the base; the distal phalanges compressed, forming an angle with the basal portion of the digits, the lower surface of which has a row of plates. Body not depressed, covered with uniform granules. Tail compressed, keeled. Pupil circular; eyelid distinct all round the eye. No præanal nor femoral pores."—*Boulenger* <sup>1</sup>.

## PRISTURUS FLAVIPUNCTATUS, Rüppell. (Plate IV. fig. 10.)

*Pristurus flavipunctatus*, Rüppell, N. Wirbelth. Faun. Abyss., Rept. 1835, p. 17, pl. 6. fig. 3; Gray, Cat. Liz. B. M. 1845, p. 171; Blanford, Ann. & Mag. N. H. (4) xiii. 1874, p. 454; Vaillant, in Révoil, Faun. et Flor. Pays Comalis, Rept. & Batr. 1882, p. 16; Blgr. Cat. Liz. B. M. i. 1885, p. 52; Proc. Zool. Soc. 1895, p. 531; Ann. Mus. Civ. Genov. ser. 2, xvi. (xxxv.) 1896, p. 546; id. op. cit. xvii. (xxxvii.) 1897, p. 277; Strauch, Mém. Ac. St. Pétersb. (vii.) xxxv. no. 2, 1887, p. 45; Boettger, Kat. Rept. Mus. Senck. 1893, p. 24; Anderson, Proc. Zool. Soc. 1895, p. 638; Herpet. Arabia & Egypt, 1896, p. 98; Del Prato, Atti Soc. Ital. xxxv. 1895, p. 24.

*Gymnodactylus flavipunctatus*, D. & B. iii. 1835, p. 417; A. Dum. Cat. Rept. Paris Mus. 1851, p. 43; Gasco, Viaggio in Egitto, pt. ii. 1876, p. 110.

*Saurodactylus flavipunctatus*, Fitz. Syst. Rept. 1843, p. 91.

1 ♂. Suakin. Surgeon-Captain R. H. Penton, D.S.O.

3 ♂ and 5 ♀. Durrur.

Head rather high; forehead nearly flat or faintly concave; snout moderately pointed, its length from the inner canthus of the eye equalling the interorbital breadth and considerably exceeding the distance between the eye and the ear. Eye moderately large, its longitudinal axis almost equalling the interval between itself and the ear. Ear-opening oval, about one-third the diameter of the eye, oblique in position. Nostril defined by the rostral and three nasals, the largest internal. Rostral nearly twice as high as broad, quadrangular, and its upper border notched by a median furrow. Six to nine upper labials, the prevalent number being eight; five or six lower labials. Mental broad, rounded behind, but occasionally truncately triangular, with enlarged granules behind it and some of the labials. Limbs moderately long; the fore limb when laid forwards has the wrist opposite to the anterior border of the eye, or nearly so, and when laid backwards it does not reach the groin; the hind limb may just reach the axilla, extend to the shoulder, or even pass beyond it. Digits moderately

<sup>1</sup> Cat. Liz. B. M. i. 1885, p. 52.

long and slender. Tail longer than the body, laterally compressed, in the male provided with a strongly serrated dorsal ridge and a corresponding ridge on the ventral surface, but less developed; the dorsal ridge is prolonged on to the dorsal surface of the body, in the male as a line of enlarged spiny granules, absent in the female; in the latter the caudal ridges are represented by enlarged granules. Head, body, limbs, and tail covered with minute granules, largest on the snout; granules on the under surface of the body equalling those on the snout.

General colour rather dark greyish brown, with feebly defined darker cross-bars, and sometimes with a pale mesial dorsal line, the sides more or less spotted with reddish. A fine dark brown band from the rostral through the eye and over the temporal region. Lower labials, throat, and sides of the belly finely dark spotted. General colour of underparts whitish.

It attains to about 80 millim. in total length, of which the tail measures <sup>41</sup>50 millim.

This gecko is distributed over the great littoral plain at Suakin and Durrur. Dr. Penton found a single specimen at Suakin in a hole tenanted by a *Varanus griseus* and by a burrowing toad (*Bufo pentoni*). It is very active, and frequents not only the sandy plain, but rocks and the trunks of trees. Colonel Yerbury states that at Aden it is common on the rocks, and at Lahej on the trunks of baboul trees. At Assab, in Eritrea, it has also been observed on these trees.

This species was first found at Massowa by Rüppell, and, for many years, the only examples in the British Museum were two females presented by the Frankfort Museum. In the Catalogue of the former Museum two specimens are referred, with doubt, to Syria, as its occurrence in that country is highly improbable. In 1874, Mr. Blanford met with it at Maskat in Arabia. Gasco described, in 1876, a specimen collected in the Sudan by Dr. Ori, but the exact locality whence it was obtained is unknown. In 1895, Mr. Boulenger recorded it from Milmil in Western Somaliland, and in the following year from Assab, in Eritrea. In 1895, I mentioned its presence at Aden. It has never been observed in the Nile valley proper.

The length of the hind limb is subject to great variation, irrespective of sex or locality, and the fore limb is equally variable.

A small *Acarus* of the genus *Gekobia* infests this gecko. It is probably *G. loricata*, Berlese, and in its bright reddish colour it resembles the similarly-coloured spots found on the gecko.

Mr. Boulenger has recently published a revision of this group in which he recognizes seven species<sup>1</sup>, viz.:—First, *P. percristatus*, from the same region in which *P. flavipunctatus* is found; second, *P. flavipunctatus* itself, the distribution of which has already been given; third, *P. rupestris*, Blanford, from S.E. Arabia, the shores of the Persian Gulf, Sind, and the island of Socotra; fourth, *P. insignis*, Blanford,

<sup>1</sup> Ann. Mus. Civ. Genov. ser. 2, xvi. (xxxvi.) 5 Giugno, 1896, p. 4.

from Socotra; fifth, *P. crucifer*, Val., from Berbera (Las Gori), Abyssinia, Western Somaliland, and S. Arabia; sixth, *P. phillipsii*, Blgr., also from Berbera; and, lastly, *P. carteri*, Gray, from the island of Masira off the east coast of Arabia. Another species was described by Steindachner as *Spatalura collaris*, but the locality whence it was obtained is unknown. Mr. Boulenger provisionally regards it as a variety of *P. carteri*, Gray.

The species of *Pristurus* are divided by Mr. Boulenger into two groups, depending on whether the rostral shield enters into or does not enter into the formation of the nostril. In the first four the rostral borders the nostril, while in the remaining three species it does not.

*P. percristatus* and *P. flavipunctatus* are closely allied, but the males of the former are easily distinguished from those of the latter by their stronger dorsal crest extending to the nape, whereas in *P. flavipunctatus* it extends on to the anterior half of the body only. These stronger-crested geckos have a slightly longer hind limb than *P. flavipunctatus*, as it may extend to the shoulder or between the shoulder and the ear, while in *P. flavipunctatus* it reaches the axilla or slightly beyond the shoulder. The variability of the crest in *Pristurus*, the extent to which the length of the limbs varies in *P. flavipunctatus*, and the difficulty that will be experienced in distinguishing the females of *P. percristatus* from those of *P. flavipunctatus* are considerations which suggest the possibility of the former being only a variety of the latter. Characters derived from the degree of development of the crest seem to be misleading, for when Mr. Boulenger defined *P. crucifer* and *P. phillipsii* his materials led him to conclude that while the latter had a caudal crest, the former had none. Since then male specimens of *P. crucifer* with a very rudimentary caudal crest have been recorded by him from Capt. Bottego's collection from Southern Somaliland, so that *P. crucifer* has a caudal crest as well as *P. phillipsii*.

I recently referred 39 specimens of a gecko of this genus from the Hadramut, Arabia, with considerable doubt, to the species described by Steindachner as *P. collaris*, but pointed out at the same time that they differed from *P. carteri*, Gray, the types of which were before me, in having a well-defined black collar and by the absence of a mesial patch of spiny scales on the middle of the belly. In the original description of *Spatalura collaris*, Stdn. = *P. collaris*, the lizard is said to have a dorsal crest, a structure entirely absent in the Hadramut geckos. Some of the latter, however, were compared by Dr. Werner with the types preserved in the Vienna Museum, with which he found them to be perfectly identical, so that I was entitled to conclude that the types had no dorsal crest, and that an error had crept into Steindachner's description. If, however, on further examination the types of *P. collaris* should reveal the presence of a rudimentary dorsal crest, its absence in the Hadramut specimens would not necessarily imply that they were distinct from *P. collaris*, in view of the variable development of the dorsal and caudal crests in other species.



With reference to the mesial patch of enlarged scales on the belly, it is worthy of note that while it is present in both the types of *P. carteri*, no trace of it exists in the 39 specimens doubtfully and tentatively referred by me to *P. collaris*, and that in all the other species of this genus it only rarely shows itself in the well-marked and perfectly distinct *P. flavipunctatus*. Recently, Mr. Boulenger has examined 294 examples of *P. percristatus*, but he makes no mention of its presence in any of them. Before accepting the specific identity of *P. carteri* and *P. collaris*, it should first be ascertained whether these enlarged scales are only sometimes present in the geckos from the island of Masira, or whether they are invariably absent in those from the Hadramut. The evidence, as yet, that they are specifically identical does not appear to me to be conclusive. Nothing, moreover, can be definitely settled on this point until the essential characters of the types of *P. collaris* are known.

It may be as well to point out that while the nostril in *P. carteri* is defined by two large nasals and by a small one, in 36 out of the 39 specimens of the Hadramut geckos it is perforated in a single, rather swollen, crescentic shield, the two horns of which are either in contact behind the nasal opening or are separated from each other by interposed granules. In the three exceptions, on the other hand, the nostril is formed as in *P. carteri*.

## PTYODACTYLUS.

*Ptyodactylus*, Gray, Ann. Phil. (new ser.) x. 1825, p. 198.

Digits free, with transverse plates on the proximal portion of their under surfaces; distal extremity of each digit dilated into a fan-like expansion, with a small median fissure at its free end, from which a fine sulcus traverses the under surface of the expansion, dividing it into two lateral halves, each of which is covered with from 7 to 12 divergent lamellæ; a small retractile claw in the median fissure. Body either wholly covered with small granules, or with intermixed enlarged tubercles; abdominal scales small, smooth, and nearly imbricate. Pupil vertical. Neither præanal nor femoral pores.

Linnæus, in his preface to Frederick Hasselquist's '*Iter Palæstinum*,' which appeared in 1757, mentions that he had been deputed by the Queen of Sweden to arrange and publish the manuscripts of his distinguished pupil, who had died at Smyrna, 9th February, 1752, in the thirtieth year of his age. Linnæus, as Hasselquist's editor, states that he had carefully digested the work in the best way he could, had arranged every thing under its proper title, and had altered the technical names and manner of writing them without changing the author's meaning. He further says that the synonyms of the different species enumerated in the '*Iter Palæstinum*' would be found in the tenth edition of his '*Systema Naturæ*.'

In the second part of Hasselquist's posthumous work, a gecko is described under the name of *Lacerta gecko*, a term which Linnæus had previously given<sup>1</sup> to the Asiatic gecko, *G. verticillatus*, Laur. It afterwards appeared in the '*Systema Naturæ*'<sup>2</sup>. Schneider evidently regarded it as a distinct species, as he speaks of it as Hasselquist's gecko; but he did not designate it *Stellio hasselquistii*, as has been stated by Cuvier and repeated by Duméril and Bibron and other authors. The author who first called it *L. hasselquistii* was Donndorff.

Hasselquist's gecko was described by Is. Geoffroy St.-Hilaire as *Le Gecko lobé*, and there are two figures of it in the great French work on Egypt. In the first set of Reptilian plates it is represented on pl. 5. fig. 5, and in the Supplementary plates on pl. 1. fig. 2. Audouin, who dealt with the latter plates, considered that the lizard there represented was a variety of the lizard figured on pl. 5.

In view of the existence of two types of nostril in these Egyptian geckos, the one merely swollen and the other tubular, it is unfortunate that it cannot be said with any certainty whether these figures represent both or only one of them. The essentially tubular nostril is formed by the first labial and three nasals, and exceptionally by three

<sup>1</sup> Mus. Adolph. Frid. 1754, p. 46.

<sup>2</sup> 12th ed. i. 1766, p. 365.

nasals only, while the simply swollen nostril is generally defined by the rostral, first labial, and three nasals.

On Suppl. pl. 1 there is an elongated view (fig. 2<sub>2</sub>) of the upper surface of the head of figure 2, in delineating which evident pains had been taken to give the details of the structure of the nostril, which is shown to have been formed by the rostral, first labial, and three nasals; but the shape of the head is not that of the *gecko lobé*.

On the Plain of Suez, close to the Sinaitic Peninsula, geckos of this species (Pl. VI. fig. 5) occur with somewhat heavier and more rounded bodies, larger, broader, and much less depressed heads, and larger digital disks than the common *gecko lobé* of Egypt. Their nostrils are not tubular, but are somewhat more swollen than in the latter; and in two specimens in my possession from that locality the opening is irregularly and asymmetrically defined, as, in both, the rostral is absent on one side of the head and present on the other. The tail also is more rounded than in the *gecko des maisons*. It appears to me that it is a gecko of this kind that is represented on Suppl. pl. 1. fig. 2, and that the gecko on pl. 5. fig. 5 is the common form with the slightly depressed head, slender body, and somewhat smaller disks (*vide* Pl. VI. figs. 1 & 2). The specimen of the *gecko lobé* described by Is. Geoffroy was 5 inches long; and he states that the body and head were depressed and flattened, which is evidence that he was not describing a gecko resembling fig. 5 of Pl. VI. of this work, as this gecko has a high and broad head. As already stated, Audouin regarded the gecko figured by Savigny on Suppl. pl. 1. fig. 2 as a variety of the *gecko lobé*. This so-called variety I suppose to have been the equivalent of the Suez geckos.

When Mr. Boulenger wrote, in 1891, the tubular-nosed geckos and those with merely swollen nostrils were represented in the British Museum only by three of the former and by two of the latter, whereas there were eight specimens of the Sinaitic and Palestine geckos and four geckos from Maskat. He regarded the tubular or much-swollen nosed geckos as the typical form.

In dealing with this species I have had 94 specimens before me: the Nile valley has contributed 36, the Sinaitic Peninsula and the Plain of Suez 5, Southern Syria 9, South-eastern Arabia 4, the Hejaz 3, Algeria 5, Eritrea (Ghinda) 27, and Shoa 5.

The geckos found in the Nile valley belong to two groups. The first I shall call Phalanx I., and the second Phalanx II. To the first I also refer the geckos from the Hejaz, and to the second likewise certain geckos from the Plain of Suez, the Sinaitic Peninsula, Syria, and South-eastern Arabia. The geckos from Algeria seem to deserve recognition as a distinct variety, as do also those from Eritrea and Shoa.

As the geckos of the first Phalanx represent the gecko first described by Is. Geoffroy as *Le Gecko lobé*, it may be designated "*Phalanx typica*"; and as those of the second Phalanx embrace geckos conforming more or less to the geckos from Tor in the Sinaitic Peninsula named by Heyden *P. guttatus*, it may appropriately be called

"*Phalanx guttata*." This phalanx is capable of being divided into two sections, depending on the formation and degree of tumescence of the nostril—one in which it is swollen, and the other in which it is tubular.

Certain members of the second Phalanx, such as the geckos of Syria, lead more or less into the geckos of Algeria, and Eritrea and Shoa; but, at the same time, they are so distinct that they never could be confounded with the geckos from the three last-mentioned localities, or with the typical form from Egypt; neither could an Eritrean or Shoa gecko be ever mistaken for one from Algeria or from Egypt. The North-west African geckos stand as var. *oudrii*, and the Eritrean I propose to call var. *ragazzi*, in honour of Dr. Ragazzi, whose collections along the shores of the Red Sea and in Eritrea and Shoa have thrown so much light on the herpetology of that region.

I have in the synonymy attempted, by breaking it up, to show the forms which have been dealt with by those who have written on this group.

The two species of the genus are distinguished as follows:—

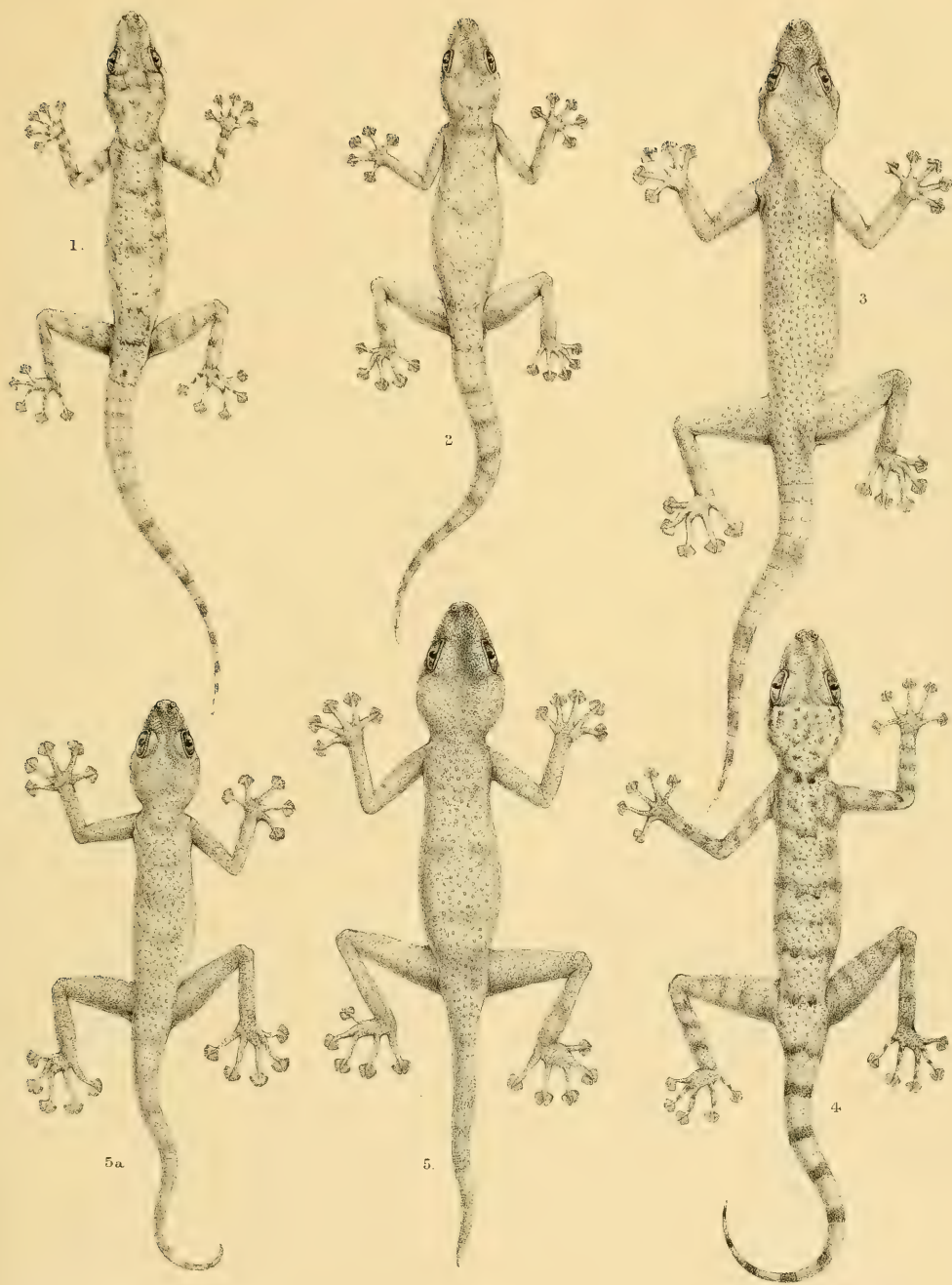
- Body covered with uniform small granules . . . . . *P. homolepis*.  
 Body covered with small granules and intermixed keeled tubercles . . . . . *P. hasselquistii*.

#### PTYODACTYLUS HASSELQUISTII, Donndorff. (Plates VI. & VII.)

##### I. *Phalanx typica*. (Plate VI. figs. 1–3.)

- Lacerta gecko*, Hasselq. & Linn. Iter Palæst. 1757, p. 306; *part.*, Syst. Nat. i. 1766, p. 365; Forskål, Descr. An. 1775, p. viii et p. 13.  
*Stellio gecko*, *part.*, Schneider, Amph. Phys. 1792, p. 12.  
*Lacerta hasselquistii*, Donndorff, Zool. Beytr. 1798, iii. p. 133; Bechstein, Lacép. Nat. Amph. ii. 1800, p. 262.  
*Le Gecko des maisons*, Cuv. Règn. An. ii. 1817, p. 49; nouv. éd. ii. 1829, p. 56.  
*Gekko ascalabotes*, *part.*, Merr. Tent. Syst. Amph. 1820, p. 40.  
*Gekko lobatus*, Licht. Verz. Doubl. Berl. Mus. 1823, p. 103; Is. Geoffr. St.-Hil. Descr. de l'Égypte, H. N. i. ?1827, p. 132, pl. 5. fig. 5; id. op. cit. 8vo ed. xxiv. 1829, p. 37; Schinz, Nat. Abbild., Rept. 1833–35, p. 74, tab. 17; Boettger, Kat. Rept. Mus. Senck. 1893, p. 27.  
*Gekko maculatus*, Schinz, op. cit. tab. 16.  
*Ptyodactylus lobatus*, Gray, Ann. Phil. (2) x. 1825, p. 198; Fitz. Syst. Rept. 1843, p. 96; Bigr. Cat. Liz. B. M. i. 1885, p. 110 (specimens *d* and *e*); Trans. Zool. Soc. xiii. 1891, p. 111 (specimens 9 and 10); Strauch, Mém. Ac. St. Pétersb. (vii.) xxxv. 1887, p. 35 (? Egyptian and Kosseir specimens); Boettger, Kat. Rept. Mus. Senck. 1893, p. 27? (Egyptian specimen).  
*Ptyodactylus hasselquistii*, D. & B. iii. 1836, p. 378, pl. 33. fig. 3; Rüppell, Mus. Senck. iii. 1845, p. 300; Duméril, Cat. Rept. Paris Mus. 1851, p. 40; Gasco, Viag. Egitto, pt. ii. 1876, p. 110; Boutan, Rev. Biol. Nord France, v. 1893, p. 336, fig. 1; Anderson, Herp. Arabia & Egypt, 1896, p. 56 & p. 98, typical form.  
*Ptyodactylus gecko*, Gray, Cat. Liz. B. M. 1845, p. 151 (specimen *d*).  
*Ptyodactylus gecko*, Klunzinger, Zeitschr. Ges. Erdk. Berl. xiii. 1878, p. 94.





J. Green del. et lith.

PTYODACTYLUS HASSELQUISTII.

Fig. 1 ♂, Assuan, *Phalanx typica*.  
 Fig. 2 ♂, Philæ  
 Fig. 3 ♂, Medina, Arabia "

Fig. 4 ♀, Maskat, Arabia, *Phalanx guttata*.  
 Fig. 5 ♂, Plain of Suez "  
 Fig. 5a ♂, Abu Roash, Gizeh "



- 1 ♀. Mokattam Hills, Cairo. Dr. Walter Innes.  
 1 ♂. Luxor.  
 2 ♀. Temple of Medinet Habu.  
 1 ♀. Temple of Edfu.  
 3 ♂ and 2 ♀. Houses, Assuan.  
 2 ♂ and 5 ♀. Temple of Philæ.  
 1 ♀. Wādī Halfa.  
 3 ♂ and 3 ♀. Wādī Halfa. O. Charlton, Esq.

Form slender; body slightly depressed; head elongately or shortly oviform, slightly depressed; nostrils more or less swollen, formed by the rostral, first labial, and three nasals; eye large. Upper labials 11 to 14, generally 13; lower labials 11 to 13, usually 12. Length of limbs variable, generally moderately long and slender; the fore limb half a finger's length in advance of the snout, or the tip of the third digit only reaching to between the eye and the snout; hind limb reaches the shoulder or does not extend beyond the axilla; disks only moderately large; the lamellæ vary from 8—8, 8—9, to 9—9. Tail slightly depressed, with usually a feeble longitudinal sulcus above, more or less verticillate, with or without small tubercles on the verticils. Skin soft and porous; granules moderately large, conical, smooth or carinate (Hejaz); tubercles moderate, numerous, more or less carinate; enlarged non-carinate or carinate (Hejaz) granules before the eye, about twice or three times as large as the dorsal granules; no enlarged tubercles on the side of the head, but some of the granules larger than the others; a few enlarged tubercles on the radial section of the fore limb and on the hind limb generally, exceptionally only on the thighs and tibial portion, or rarely entirely absent on both limbs. Ventrals smooth, small, subhexagonal, imbricate, largest on the femoral and interfemoral areas.

Pale sandy grey or even whitish above, but varying in accordance with its surroundings; generally a brown line from the snout to the eye, continued more or less behind the eye above the ear to the nape of the neck, where it meets its fellow of the opposite side, or the nuchal portion may become broken up; top of the head reticulately brown spotted. Transverse more or less V-shaped brown bands on the back, frequently broken up; limbs and tail generally barred with brown; underparts white.

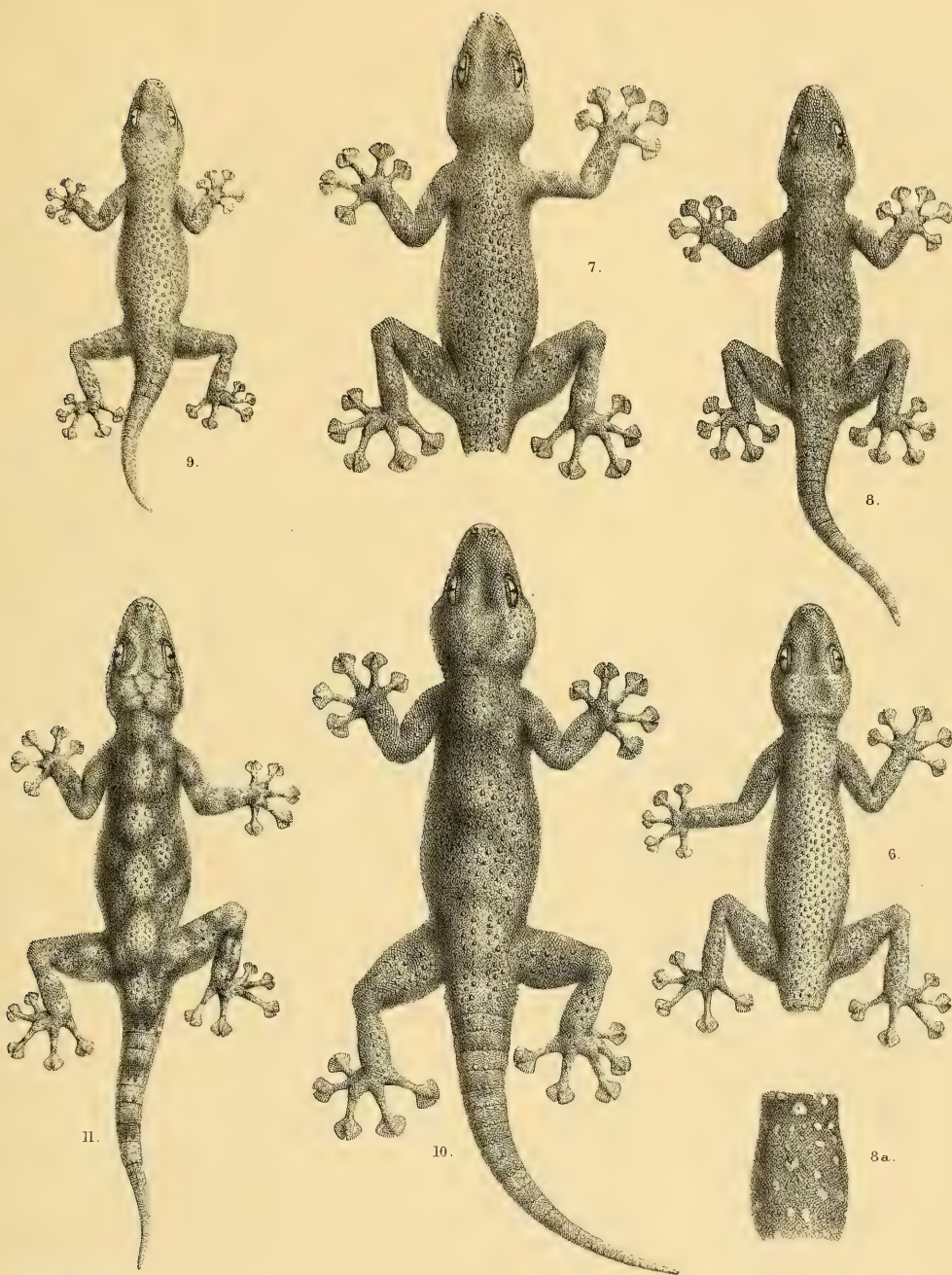
Largest Egyptian male . . . .	Snout to vent 76 millim. (
„ male from Hejaz . . . .	„ „ 86 „

*Hab.* The Nile valley; and the Hejaz, Arabia.

Sex.	Snout to vent.	Tail.	Head, length.	Head, width.	Formation of nostril.	Character of nostril.	Fore limb reaches	No. of lamellæ on 3rd digit.	Hind limb reaches	No. of lamellæ on 3rd digit.	Labials.	Locality.
Juv...	39	45	12	8	R. L. 3 N.	Sw.	L. A. Sn.	8	A. Sh.	9	<sup>12</sup> <sup>12</sup>	Dar Fadda, betw. Medina & Wish.
♀ ..	55	..	16	11	"	"	"	8	Sh.	9	<sup>13</sup> <sup>12</sup>	Wādī Halfa.
♀ ..	56	..	16	10	"	"	"	8	"	8	<sup>13</sup> <sup>11</sup>	Philæ.
♀ ..	58	58	16	11	"	N. F.	S. A. Sn.	9	A. Sh.	9	<sup>12</sup> <sup>11</sup>	Edfu.
♀ ..	60	..	18	12	"	Sw.	"	8	Sh.	8	<sup>12</sup> <sup>12</sup>	Wādī Halfa.
♀ ..	60	..	17	11	"	"	"	8	"	8	<sup>11</sup> <sup>11</sup>	Philæ.
♀ ..	62	73	18	12	"	"	L. A. Sn.	8	"	8	<sup>11</sup> <sup>11</sup>	"
♀ ..	64	..	19	12	"	"	"	9	"	9	<sup>13</sup> <sup>13</sup>	Wādī Halfa.
♀ ..	64	..	18	11	"	"	S. A. Sn.	8	"	8	<sup>12</sup> <sup>11</sup>	Philæ.
♀ ..	64	..	19	12	"	"	"	8	A. Sh.	8	<sup>13</sup> <sup>11</sup>	"
♂ ..	64	66	19	14	"	"	....	9	....	9	<sup>14</sup> <sup>13</sup>	Wādī Halfa.
♀ ..	66	57	19	12	"	"	S. A. Sn.	9	Sh.	9	<sup>11</sup> <sup>12</sup>	Medinet Habu.
♂ ..	67	..	20	13	"	"	Sn.	8	"	9	<sup>13</sup> <sup>12</sup>	Wādī Halfa.
♀ ..	67	68	19	13	"	M. S.	S. A. Sn.	8	"	9	<sup>13</sup> <sup>13</sup>	Mokattam Hills.
♀ ..	67	..	19	..	"	Sw.	....	..	....	..	<sup>12</sup> <sup>11</sup>	Wādī Halfa.
♂ ..	67	66	19	13	"	M. S.	S. A. Sn.	8	A. Sh.	8	<sup>13</sup> <sup>13</sup>	Hadir el Kabir, near Medina.
♂ ..	68	69	19	13	"	Sw.	B. E. Sn.	9	Sh.	9	<sup>14</sup> <sup>13</sup>	Assuan.
♀ ..	69	..	20	14	"	"	S. A. Sn.	9	"	9	<sup>12</sup> <sup>11</sup>	Luxor.
♂ ..	70	..	20	14	"	"	Sn.	9	"	9	<sup>14</sup> <sup>12</sup>	Assuan.
♂ ..	70	..	20	13	"	"	S. A. Sn.	8	"	8	<sup>13</sup> <sup>12</sup>	Philæ.
♂ ..	70	..	18	13	R. L. 3 N. L. 3 N.	M. S.	"	8	"	9	<sup>12</sup> <sup>12</sup>	"
♂ ..	72	..	21	..	R. L. 3 N.	Sw.	"	9	"	9	<sup>13</sup> <sup>12</sup>	Wādī Halfa.
♀ ..	73	..	20	13	"	"	"	8	A.	9	<sup>12</sup> <sup>12</sup>	Medinet Habu.
♂ ..	76	..	20	15	"	M. T.	N.	9	"	9	<sup>13</sup> <sup>12</sup>	Assuan.
♂ ..	86	78	24	16	"	"	S. A. Sn.	8	A. Sh.	8	<sup>13</sup> <sup>13</sup>	Hadir el Kabir, near Medina.

*Explanation.*—Measurements throughout in millimetres. R. L. 3 N., rostral, first labial, and three nasals; Sw., swollen; N. F., nearly flat; M. S., much swollen; L. A. Sn., largely in advance of snout; S. A. Sn., slightly in advance of snout; Sn., snout; B. E. Sn., between eye and snout; N., nostril; A. Sh., advance of shoulder; Sh., shoulder; A., axilla.





H. Grönqvist del. et lith.

PTYODACTYLUS HASSELQUISTII.

Fig. 6 ♀, Jerusalem, *Phalanx guttata*.  
 Fig. 7 ♂, Mount Carmel       "  
 Fig. 8 ♂, Lake Huleh       "

Fig. 8a, Jerash Gilead, *Phalanx guttata*.  
 Fig. 9 ♀, Bou Saada, Algeria, var. *oudrii*.  
 Figs. 10 & 11, ♂ & ♀, Ghinda, Eritrea, var. *ragazzi*.



II. *Phalanx guttata*. (Plate VI. figs. 4 & 5; Plate VII. figs. 6, 7, 8, & 8 a.)

## Section I. Nostril swollen.

*Gecko des maisons*, var., Aud. Descr. de l'Égypte, N. H. i. ? 1829, p. 165, Suppl. pl. i. fig. 2; id. op. cit. 8vo ed., N. H. vi. 1829, p. 104.

*Ptyodactylus guttatus*, Heyden, Rüppell, Atlas nördl. Afr., Rept. 1827, p. 13, pl. iv. fig. 1.

*Ptyodactylus hasselquistii*, Boettger, Ber. Senck. nat. Ges. 1879-80, p. 194; Tristram, West. Palest., Rept. & Batr. 1884, p. 150; Hart, Fauna & Flora Sinai &c. 1891, p. 210; Bedriaga, Bull. Soc. Nat. Mosc. iv. 1879, p. 16.

*Ptyodactylus lobatus*, Blgr. Cat. Liz. B. M. i. 1885, p. 110 (specimens *f* to *o*); op. cit. iii. 1887, p. 484; Trans. Zool. Soc. xiii. 1891, p. 111 (specimens 11 to 18); Boettger, Kat. Rept. Mus. Senck. 1893, p. 27 (specimens *a-c* and Arabian specimen).

*Ptyodactylus lacazii*, Boutan, Arch. Zool. Expér. (2) x. 1892, p. 17.

*Ptyodactylus bischoffsheimi*, Boutan, Rev. Biol. N. France, v. 1893, p. 340, pl. iii. fig. 1.

*Ptyodactylus montmahoui*, Boutan, l. c. p. 369, pl. iii. fig. 2.

*Ptyodactylus barroisi*, Boutan, l. c. p. 375, pl. iii. fig. 3.

*Ptyodactylus puisueuci*, Boutan, l. c. p. 379, pl. iii. fig. 4.

*Ptyodactylus lobatus syriacus*, Peracca, Boll. Mus. Torino, ix. 1894, no. 167, p. 1.

1 ♂ and 1 ♀. Plain of Suez.

Body shorter and stouter than in *Phalanx typica*, variable, much stouter in some (Syria) than in others (Egypt and Maskat); head generally elevated, but exhibiting various degrees of depression. Nostril swollen, more so in some than in others, defined by the rostral, first labial, and three nasals, or asymmetrically by the exclusion of the rostral, or symmetrically by the exclusion of the first labial. Eye large. 11-13 upper labials, exceptionally 14 or 15, usually 12 or 13; 10-13 lower labials, generally 11 or 12, occasionally 13, rarely 10 or 14. Limbs very variable, sometimes long and moderately slender, in others (Syria) short and stout; disks variable, larger in some than in others, largest in the Syrian geckos; generally 9-9 lamellæ, occasionally 10-10, rarely 8-8 and 11-11. Tail more or less rounded, thicker at the base in some (Syrian) than in others (Sinaitic Peninsula), with indications of a longitudinal sulcus, verticillate, with a few tubercles; length variable. Skin not soft and porous, rather dry; granules variable, larger in some (Syrian) than in others. Enlarged tubercles generally present on the limbs (Syria), exceptionally absent (Egypt delta). Rounded tubercles sometimes on the side of the head and at the angle of the mouth (Syria). Ventrals variable, small in some (Maskat).

Colour on dorsal surface pale fawn, yellowish olive, or grey, uniform in colour or nearly so, but generally with obscure darkish transverse bands on the back and faint pale spots, or strongly marked with cross zigzag brown bands or with reticulate darker markings enclosing bluish-white spots and dark dots; sometimes uniformly olive with white spots, occasionally brilliantly so (Jerash, Pl. VII. fig. 8 a), while in others dark

brown spots are present; some greyish, finely dotted with white; limbs generally barred with darker, but the bars are sometimes obsolete (Egypt) or only feebly indicated. Tail usually barred, or nearly uniform in its coloration.

Variable in size. Largest specimen, ♂: snout to vent 90 millim.

*Hab.* The Sinaitic Peninsula, including the Plain of Suez to Northern Syria, and through Arabia to Maskat.

Sex.	Snout to vent.	Tail.	Head, length.	Head, width.	Formation of nostril.	Character of nostril.	Fore limb reaches	No. of lamellae on 3rd digit.	Hind limb reaches	No. of lamellae on 3rd digit.	Labials.	Locality.
Juv. . .	46	..	14	10	R. L. 3 N.	Sw.	L. A. Sn.	10	N. Er.	10	13 13	Jerusalem.
♀ ..	64	..	22	14	L. 3 N. R. L. 3 N.	"	....	8	....	8	11 10	Capernaum.
♀ ..	65	..	20	13	R. 3 N.	"	S. A. Sn.	10	Er.	10	13 13	"
♀ ..	65	..	20	13	R. L. 3 N.	M. S.	L. A. Sn.	9	F. Sh.	9	13 13	Maskat.
♀ ..	67	..	20	15	"	"	L. A. Sn.	9	N. Er.	9	12 12	Sinaitic Penin- [sula.
♂ ..	67	..	21	15	L. 3 N. R. L. 3 N.	Sw.	....	8	....	8	12 11	Galilee. <sup>1</sup>
♀ ..	67	..	..	..	R. L. 3 N.	M. S.	S. A. Sn.	9	B. Sh. & Er.	9	12 12	Mount Sinai.
— ..	70	..	22	15	"	Sw.	....	9	....	9	12 10	Jerash.
♀ ..	72	61	21	15	L. 3 N. R. L. 3 N.	M. S.	L. A. Sn.	9	A. Sh.	9	13 11	Plain of Suez.
♀ ..	74	..	22	16	R. L. 3 N.	Sw.	S. A. Sn.	10	"	10	12 13	Jerusalem.
♀ ..	77	..	22	18	"	"	"	11	B. Sh. & Er.	11	13 12	"
♂ ..	78	56	22	17	R. L. 3 N. L. 3 N.	M. S.	L. A. Sn.	9	A. Sh.	9	13 13	Plain of Suez.
♀ ..	78	76	23	16	R. L. 3 N.	Sw.	"	9	B. S. & E.	9	12 12	Maskat.
♂ ..	81	..	25	17	R. 3 N.	"	S. A. Sn.	10	"	10	12 11	Mount Carmel.
♂ ..	84	..	24	18	R. L. 3 N.	"	"	10	"	10	13 12	Jerusalem.
♀ ..	88	81	24	16	"	M. Sw.	L. A. Sn.	9	A. Sh.	9	11 11	Maskat.
♂ ..	90	..	26	18	"	"	"	9	"	9	14 14	"

*Explanation.*—N. Er., near ear; F. Sh., front of shoulder; B. S. & E., between snout and eye.



## Section II. Nostril tubular. (Plate VI. fig. 5 a.)

*Ptyodactylus gecko*, Gray, Cat. Liz. B. M. 1845, p. 151 (specimens *a* to *c*).

*Ptyodactylus lobatus*, Blgr. Cat. Liz. B. M. i. 1885, p. 110 (specimens *a* to *c*); Trans. Zool. Soc. xiii. 1891, p. 111 (specimens 6 to 8).

*Ptyodactylus hasselquistii*, var. *siphonorhina*, Anders. Herpet. Arabia & Egypt, 1896, p. 98.

1 ♂. Abu Roash, near Gizeh. The late V. Ball, Esq., C.B.

1 ♂ and 1 ♀. Beni Hassan. M. W. Blackden, Esq.

1 ♂ and 4 ♀. Desert, Lower Egypt. A. R. Birdwood, Esq.

Nostrils tubular, defined by the first labial and three nasals. These geckos are smaller than those of the first section of this Phalanx.

*Hab.* The Nile valley, the northern portion of the delta, and the Sinaitic Peninsula.

Sex.	Snout to vent.	Tail.	Head, length.	Head, width.	Formation of nostril.	Character of nostril.	Fore limb reaches	No. of lamellæ on 3rd digit.	Hind limb reaches	No. of lamellæ on 3rd digit.	Labials.	Locality.
Juv. . .	48	..	15	10	L. 3 N.	Tubular.	L. A. Sn.	9	Sh.	9	$\frac{12}{12}$	Egypt.
♂ ..	54	46	16	11	"	"	"	9	Er.	9	$\frac{13}{12}$	Thebes.
♀ ..	62	49	18	13	"	"	A. Sn.	9	A. Sh.	9	$\frac{13}{12}$	Lower Egypt.
♀ ..	62	49	18	14	"	"	"	9	"	9	$\frac{12}{11}$	" "
♂ ..	63	..	19	14	"	"	"	10	N. Er.	10	$\frac{13}{13}$	Abu Roash.
♀ ..	65	49	18	14	"	"	"	9	A. Sh.	9	$\frac{12}{11}$	Lower Egypt.
♀ ..	66	..	18	13	"	"	L. A. Sn.	9	B. Sh. Er.	9	$\frac{13}{11}$	Beni Hassan.
♀ ..	68	53	19	13	"	"	"	9	"	9	$\frac{12}{11}$	" "
♂ ..	69	55	19	15	"	"	A. Sn.	9	A. Sh.	9	$\frac{11}{11}$	Lower Egypt.
♂ ..	69	55	19	14	"	"	"	10	Er.	10	$\frac{15}{13}$	Luxor.
♀ ..	70	56	20	14	"	"	"	10	N. Er.	10	$\frac{12}{12}$	Sinaitic Peninsula.
♀ ..	70	52	20	14	"	"	"	9	A. Sh.	9	$\frac{12}{10}$	Lower Egypt.
♂ ..	72	62	21	14	"	"	L. A. Sn.	9	Er.	9	$\frac{12}{11}$	Thebes.
♂ ..	75	..	21	14	"	"	"	9	"	9	$\frac{12}{12}$	Egypt.
♂ ..	76	..	21	15	"	"	"	9	"	9	$\frac{13}{12}$	"

## Var. OUDRII. (Plate VII. fig. 9.)

*Ptyodactylus oudrii*, Lataste, Le Natur. 1880, p. 229; Boutan, Rév. Biol. N. France, v. 1893, p. 343, fig. 2, texte.

*Ptyodactylus gecko*, Strauch, Mém. Ac. St. Pétersb. (vii. sér.) xxxv. no. 2, 1887, p. 35 (Batna specimen).

*Ptyodactylus lobatus*, Blgr. Cat. Liz. B. M. i. 1885, p. 110 (specimens *p* to *s*).

*Ptyodactylus lobatus*, var. *oudrii*, Blgr. Trans. Zool. Soc. xiii. 1891, p. 111 (specimens 1 to 5), pl. xiii. fig. 2; Boettger, Kat. Rept. Mus. Senck. 1893, p. 27; Zool. Centralbl. 1894, p. 376; Werner, Verh. zool.-bot. Ges. Wien, xlv. 1894, p. 76.

Form stout; body rather short and depressed; nostril very slightly swollen, formed by the rostral, labial, and three nasals. Eye moderate. 10 to 12 upper and 10 or 11 lower labials. Limbs short and stout; disks moderate; 7 lamellæ on the third digit of the fore and the hind limb. Tail depressed; central sulcus present; verticillate, with generally two tubercles on each verticil, granules rather coarse; tubercles moderately large; a few enlarged granules and tubercles on the temporal region before the ear and at the gape. Tubercles more or less present on both limbs. Ventrals moderately large.

Olive-brown above, uniformly so or frequently spotted with dark brown; the limbs, digits, and tail barred with brown, the last sometimes spotted. Under surface white.

It attains only to a small size: snout to vent 57 millim.

*Hab.* Algeria.

Sex.	Snout to vent.	Tail.	Head, length.	Head, width.	Formation of nostril.	Character of nostril.	Fore limb reaches	No. of lamellæ on 3rd digit.	Hind limb reaches	No. of lamellæ on 3rd digit.	Labials.	Locality.
Juv...	39	..	12	9	R. L. 3 N.	S. Sw.	Sn.	7	Shoulder.	7	12 11 10	Bou-Saada, Algeria.
♀ ..	43	..	14	10	"	"	A. Sn.	7	"	7	10 11 10	" "
♀ ..	49	..	15	10	"	"	"	7	"	7	11 10	" "
♂ ..	52	..	16	11	"	"	Sn.	7	"	7	12 11 11	" "
♀ ..	57	..	16	11	"	"	"	7	"	7	11 10	" "

Var. RAGAZZI. (Plate VII. figs. 10 &amp; 11.)

*Ptyodactylus lobatus*, Del Prato, Atti Soc. Ital. xxxv. 1895, p. 24; Blgr. Ann. Mus. Civ. Genova, ser. 2, xvi. (xxxvi.) 1896, p. 549.

Form stout; body rather short and somewhat depressed; head usually more or less depressed; nostril but little swollen, defined by the rostral, labial, and three nasals, but in some the first labial is excluded. Eye moderate; 12–15 upper and lower labials. Limbs short and stout; disks large; 8 to 10 lamellæ, generally 10—10, frequently 9—10, occasionally 9—9, rarely 8—9. Tail thick at the base, rounded, verticillate, with indications of a median longitudinal sulcus and usually two tubercles on the hinder margin of the verticils. Granules moderately large; tubercles keeled or nearly smooth, generally present on the fore and hind limbs; a few small tubercles on the temporal region, before the ear and sometimes about the gape. Ventrals rather large.

Dark or pale brown, usually broadly reticulated with darker, enclosing large light-coloured spots, four to five from the occiput to the pelvis and with a series on the sides of the trunk, but the reticulations and spots are sometimes nearly obsolete and the general colour becomes grey-brown. Limbs either marked like the trunk, or more or less barred with brown; tail broadly barred with dark brown. Underparts whitish.

It attains to a large size: ♂, snout to vent 96 millim., tail 68 millim.

*Hab.* Eritrea and Shoa.

Sex.	Snout to vent.	Tail.	Head, length.	Head, width.	Formation of nostril.	Character of nostril.	Fore limb reaches	No. of lamellæ on 3rd digit.	Hind limb reaches	No. of lamellæ on 3rd digit.	Labials.	Locality.
♂ ..	96	68	27	19	R. L. 3 N.	Swollen.	A. Sn.	10	Sh.	10	$\frac{14}{13}$	Ghinda.
♂ ..	91	82	26	20	"	"	Sn.	10	"	10	$\frac{14}{14}$	"
♀ ..	90	71	23	18	"	"	A. Sn.	9	"	10	$\frac{13}{12}$	"
♀ ..	74	68	21	14	"	"	L. A. Sn.	10	A. Sh.	10	$\frac{13}{15}$	"
♂ ..	78	57	22	15	"	"	S. A. Sn.	10	Sh.	10	$\frac{13}{14}$	"
♂ ..	79	..	22	16	"	"	A. Sn.	8	"	9	$\frac{12}{12}$	Alali.
♂ ..	78	..	23	16	"	"	"	8	"	9	$\frac{15}{12}$	"

The head in all the foregoing modifications of this species (*P. hasselquistii*) is marked more or less by three principal depressions, one situated behind each nostril, and the other on the snout before the eyes, and continued on to the forehead. They are most feebly marked in the typical form from Egypt, but are more pronounced in the Hejaz examples of that group. In the second Phalanx they are more strongly developed, but in the Southern Syrian and Eritrean geckos they are less so, whereas in the Galilean and Algerian groups they are still more feeble.

The heads of the two sexes differ from each other, as the head of the male is always heavier and broader posteriorly than that of the female, and the extent of this difference is illustrated by figs. 10 & 11, Plate VII. I have also figured a female lizard from Maskat (Pl. VI. fig. 4), which has a head, when viewed from above in outline, not unlike that of the male of *forma typica* (fig. 1), whereas the head of the male is not only proportionally larger than that of fig. 4, but is much broader; and in both, instead of being depressed as in Phalanx I., it is much elevated, and in this the Maskat geckos resemble the Sinaitic. Alongside of Pl. VI. fig. 1, I have figured another male, fig. 2, which illustrates the variation that may take place in the heads of the same sex. The shape of the head of the Medina gecko differs but little from that of the Egyptian members of the Phalanx, but is somewhat broader. The greatest amount of variation is met with in the heads of the second Phalanx (Pl. VI. figs. 4-5*a* and Pl. VII. figs. 6-8). When traced northwards through the Sinaitic Peninsula to Syria, it is seen to undergo considerable modifications, culminating in the large, elongately oval head of the Mount Carmel individual, which, in its general form, is not a very extreme variation on the heads of the Eastern Arabian (Maskat) geckos, which, however, are characterized by considerable elevation.

It will be observed that the nostril in the 24 specimens of the first Phalanx is defined by the R. L. 3 N., but that in a specimen from Philæ the rostral is excluded on one side of the head, so that the nasal formula L. 3 N., so characteristic of the tubular-nosed geckos of the second section of the second Phalanx, is produced. This is only an individual variation, as in six other specimens from the same locality the formula of the nostril of *Phalanx typica* is adhered to. The specimen also from the Mokattam Hills, although it follows the characteristic formula, has the first labial entering so feebly into the rim of the nostril that the slightest increase in the size of the nasal process of the rostral or in the dimensions of the posterior inferior nasal would have excluded it, and the formula R. 3 N. would have resulted. The degree to which the nostril is swollen is the subject of a certain amount of variation. In a specimen from Edfu it is so little tumid that it may be described as nearly flat, while in one from Wādī Halfa it is only slightly swollen compared with the majority of the specimens, whereas in the Medina geckos it is more swollen than in the Egyptian.

The nasal formula of the geckos of the second Phalanx, as in every other detail of their structure, is the subject of great variation. Thus in 11 out of 17 specimens



of the first section the nostril is swollen in a varying degree, and is defined by the rostral, first labial, and three nasals. In two out of the number tabulated the first labial is excluded, whereas in four the asymmetrical formula R. L. 3 N. and L. 3 N. is present. In the second section the nostril, instead of being merely swollen, rises above the snout as a short tubular orifice defined by the first labial and three nasals. The geckos, however, from the Plain of Suez by their semitubular or much swollen nostrils link the geckos with essentially tubular nostrils to those of the merely swollen type found in the Sinaitic Peninsula, Syria, and Eastern Arabia.

In those asymmetrical nostrils the nostril with the formula L. 3 N. is never tubular, so that there are other factors at work in the production of a tubular nostril besides the mere presence of the shields in question. The tubularity in the second section of Phalanx II. appears to be brought about primarily by the considerable vertical extension of the nasal process of the first labial, which rises above the level of the rostral, and the concomitant nearly vertical expansion of the nasals. The exclusion of the rostral among the members of the first section is apparently due to slight variations in the breadth of the nasal processes of the rostral and of the first labial and of the anterior upper nasal. If the nasal process of the second of these shields is large and that of the first small, the former abuts against the upper nasal and so shuts out the rostral; on the other hand, a reduction in the size of the nasal process of the first labial gives rise to the formula R. 3 N.; whereas if the nasal processes of the rostral and first labial are small, the nasals exclude them from taking any part in the formation of the nostril, and the formula 3 N. results, as in the well-marked *P. homolepis*, Blanfd., of which, however, only a few examples are known.

In the varieties *oudrii* and *ragazzi* there are no exceptions to the formula R. L. 3 N., which, with the exceptions indicated, is the prevailing formula throughout the species.

All the geckos of the second Phalanx have more or less what can only be described as a tough skin compared with the generally soft skin of the members of the first Phalanx. Among the latter, however, an individual may now and again be met with having its skin almost identical in texture with the skin of the second Phalanx. The specimens I have met with are extremely few, and it is noteworthy that they have been found in the open desert, whereas the softest-skinned geckos are encountered in the recesses of monuments and temples and in houses; but whether these differences in the habits of life are sufficient to account for the dermal modification remains to be ascertained. The skin, however, of the geckos of the second Phalanx becomes coarser in Syria than it is in the Plain of Suez.

There can be no doubt that the range of variation in the Sinaitic Peninsula and in Southern and Northern Syria is much greater than what prevails in the first Phalanx. This is very manifest in a number of details, even in the general form of the body itself. The lizard fig. 4 (Plate VI.) has almost the character of the body of the typical

form, but its high head and body practically devoid of depression are characters of the second group, which, with its coarser skin, entitle it to be placed in it. On the other hand, the smaller character of its disks and the presence of nine lamellæ on the third digit of the fore and hind limb are features of the typical form. At the same time, geckos presenting these characters are only met with in Eastern Arabia; but they suggest that, when Central Arabia is opened up to zoological science, further modifications will be forthcoming, linking them still more intimately with the geckos of Southern Syria and the Sinaitic Peninsula. Mr. Boulenger has already pointed out that the Maskat geckos resemble those from Mount Sinai.

The gecko from Palmyra figured by M. Boutan as *P. barroisi* recalls the geckos of Maskat, of the Sinaitic Peninsula, and of Southern Syria. In the type of *P. guttatus*, Heyden, the body is covered with a meshwork of reddish lines, marked here and there with dark brown spots, the interstices of the meshwork enclosing pale blue spots, from which the name of the species is derived. In *P. barroisi* the lines of the meshwork become reduced to pale yellowish brown, enclosing whitish spots, so that it conforms to the coloration of *P. guttatus*. In the Maskat geckos the longitudinal and oblique lines of the meshwork have disappeared, and with them the pale spots; but in what remains of the meshwork there are here and there darker spots, as in *P. guttatus*. At the same time, the coloration of the Maskat geckos is almost identical with that of some of the members of Phalanx I. (compare figs. 1 & 4). Their high heads, more rounded bodies and tails have led me to place them in the position they occupy.

The geckos from Lower Egypt and of the Plain of Suez have stouter bodies than those from Maskat, and in this particular they resemble the geckos of the Sinaitic Peninsula. Among the members of this Phalanx found further to the north, at Jerusalem, Mount Carmel, and Palmyra, the body becomes even stouter and shorter, and in Galilee the shortening is carried still further. The latter (Pl. VII. fig. 8) lead directly towards the Algerian geckos. Although those from Galilee and from Syria generally differ so considerably from the typical *P. guttatus*, still they present such an array of variations that when to them are added those of the geckos from the Sinaitic Peninsula, the Plain of Suez, Maskat, and the Nile valley the series is so complete that it is impossible to consent to the view propounded by M. Boutan that more than one species is represented in Syria.

In the accompanying table (p. 73) I have recorded the number of lamellæ on the third digit of the fore and of the hind limb.

In the first Phalanx 8—8 and 9—9 lamellæ are equally prevalent on the limbs, while a fourth of the 24 specimens tabulated have 8 anteriorly and 9 posteriorly. In the second Phalanx 9—9 is by far the most frequent number on both extremities, as they occur in 21 specimens out of 32. Nine is not associated with any other number; but 10 is present in a fourth of the specimens, while 8 is exceptional and

11 rare. In the five specimens of var. *oudrii* there are only 7 lamellæ. In the next, var. *ragazzi*, 16 out of the 32 specimens have 10 lamellæ on both limbs, nine have 9—10, four have 9, and three have 8—9. A glance at the accompanying table will show that the lamellæ of this variety start at a higher figure than those of either the first or second Phalanx, and that the highest number 10 is much more frequent than in either

TABLE showing the number of specimens in each Group possessing a certain number of lamellæ on the third digit of the fore and hind limb.

Fore limb, number of lamellæ.	Hind limb, number of lamellæ.	First Phalanx, number of specimens.	Second Phalanx, number of specimens.	Var. <i>oudrii</i> , number of specimens.	Var. <i>ragazzi</i> , number of specimens.
7	7	..	..	5	
8	8	9	2		
8	9	6	..	..	3
9	9	9	21	..	4
9	10	..	..	..	9
10	10	..	8	..	16
11	11	..	1		

of them. In this variety the formula 8—9 occurs only in two specimens from Alali, 13 miles N. of Assab, and in one from Shoa, whereas in the four other geckos from the last locality the formula is 9—10. The presence of 8—9 brings these Alali and Shoa geckos very close to the geckos of the typical form in number of their lamellæ.

The labial shields (see table, p. 74) yield results much akin to those of the lamellæ, in this respect: that the upper labials of the first and also of the second Phalanx are generally more numerous than they are in var. *oudrii*, whereas in var. *ragazzi* they never fall so low as they do in these two groups. In the case of the lower labials, they are sometimes quite as few in the second Phalanx as they are in the former variety; but this is not so in var. *ragazzi*, in which, like its lamellæ, they start at a higher number than do any of the others. Two of the geckos of the second Phalanx with 10 and 11 lower labials may be taken as representing *P. puisieuxi*, Boutan (Pl. VII. fig. 8). They are also distinguished by a low number of lamellæ, viz. 8; and in connexion with this and the low number of labials the fact is borne in upon us that these Galilean geckos are more intimately related to those of Algeria than are any of the others.

The eye, like every other part of the economy of these lizards, is subject to variation. In the first and in the second Phalanx it is larger than in the two varieties.

Number of Labials.	Upper Labials.				Lower Labials.			
	First Phalanx, specimens.	Second Phalanx, specimens.	Var. <i>oudrii</i> , specimens.	Var. <i>ragazzi</i> , specimens.	First Phalanx, specimens.	Second Phalanx, specimens.	Var. <i>oudrii</i> , specimens.	Var. <i>ragazzi</i> , specimens.
10	..	..	1	..	..	3	3	
11	3	3	2	..	8	10	2	
12	7	15	2	1	11	11	..	3
13	12	12	..	3	6	7	..	1
14	3	1	..	2	..	1	..	2
15	..	1	..	1	..	..	..	1

This genus is represented in Sind, Arabia, Northern Syria (Aleppo), southwards through Palestine, the Sinaitic Peninsula, and the valley of the Nile to Nubia, and to the south-east in Eritrea and Shoa, and to the west in Algeria.

*P. hasselquistii* is found under the most diverse physical and climatic conditions, a circumstance to be kept in mind in view of the remarkable variations to which it is subject. At Aleppo, 1143 feet above the sea, the most northerly point in its distribution, or nearly so, snow falls almost every year, although it lies only on the higher mountains; but at Jerusalem (2550 feet), where this gecko is present, snow and frost are not uncommon, and the whole country at that elevation may be under snow for a short time<sup>1</sup>. Similar conditions also prevail, in winter, in the higher parts of the Tell of Algeria, where this gecko is also found.

*P. hasselquistii* likewise frequents the subtropical basin of Lake Huleh, the immediate surroundings of which are little more than a swamp, in which buffaloes wallow, while the surrounding slopes are extremely fertile. Sixteen years ago, on my way from Khan Jubb Yusef to the beautiful spring of Mellâha, near Lake Huleh, I captured among some rocks the gecko (fig. 8) represented on Plate VII. It is also found at Jerash (1757 feet), on the opposite side of the Jordan, a district watered by the Jabbok, rich in oleanders, and with hills wooded with pines and oaks. It is also present on the green, well-watered slopes of Mount Carmel, a name that signifies orchard. I likewise met with it among the ruins of Capernaum, on the fertile shores of Lake Tiberias, 682 feet below the sea-level, while further to the south it has been obtained from the arid surroundings of the Dead Sea and from the slopes of Sinai. In Egypt it is found not only in the desert, but in houses on the alluvium, and in the

<sup>1</sup> Mr. Boulenger has recorded the presence of the gecko *Edura nivaria* on the heights of the Drakensberg range, N.W. Natal, and also apparently enjoying life amid the ice and snow (Proc. Zool. Soc. 1894, p. 608).



dark recesses of monuments and temples, and in the Sinaitic Peninsula in the moist warm grotto of Hamman Farun. Shoa, where it is also present, has been described by M. Aubry<sup>1</sup> as a country of high mountains covered with dense luxuriant vegetation, of streams breaking into numerous cascades and winding through magnificent prairies, of fields of cotton, maize, tief (the grass of the country), wheat, barley, beans, and peas, a region in which reigns perpetual spring.

I have frequently met with it in the daytime in the chambers of temples and on their walls outside, and I have captured it at midday on rocks in the desert. It is said to be common in native houses, but I have never observed it in any of the hotels I have resided in at Alexandria, Suez, Cairo, Mena, Heluan, Assiut, Luxor, and Assuan.

It emits a cry that has aptly been compared by Sir J. G. Wilkinson to the sound made by a man in urging on a horse.

There is a native superstition that certain kinds of food become poisoned by contact with this gecko, and if eaten produce leprosy; and Hasselquist states that at Cairo he saw the hand of a man, over which a gecko had run, become in an instant covered with red pustules and inflamed, accompanied by itching like that caused by the sting of a nettle. Cuvier has suggested that this may have been produced by the extremely fine claws of the gecko.

The natives of Egypt, in harmony with their superstition regarding this lizard, and in reference to the white leprous colour of those that frequent human habitations and the recesses of buildings and caverns, call it ابو بورس, *abu bors*, the father of lepers. I am indebted to Mr. A. G. Ellis, of the British Museum, for having directed my attention to the most interesting work of Damīrī<sup>2</sup> on animals, in Arabic, entitled 'Hayāt ul-Hayawān' ('The Life of Animals, or a Dictionary of Zoology'), written in the latter half of the 14th century. Mr. Ellis informs me that, as the term بورس, *bors*, does not occur in Damīrī's work, it cannot be regarded as classical. I have found it in common use with the Arabs of the present day for all the species of geckos, whether they be leprous-looking or not.

Dr. Walter Innes has informed me that this lizard has also another name, ابو كف, *abu kaff*. The latter term *kaff* means in Arabic the palm of the hand; so I conclude this name refers to the distention of the digits of this gecko.

The figure of a lizard, to the ancient Egyptians, signified "many" or "multitude." As a few illustrations of its occurrence on the monuments as a hieroglyph may be mentioned its presence on the tomb of Ptah Hotep; on the outer wall of the hypostyle of Karnak; on the temples of Luxor and Abu Simbul; and on a slab of red granite that

<sup>1</sup> R. Geogr. Soc. Paris, 1886.

<sup>2</sup> His real name was Kemāl ud-den Abu'l Bagā Muhammed Ben Musa Ben Isa ad-Damīrī Ash-Shafēī; but he was known as Damīrī, probably from his having been born in the town of that name to the north of Mansura. The date of his birth was 1349 A.D., and he died in 1405. He was a professor in two of the mosques in Cairo. (Nouv. Biogr. Gén. (Hoefer) xiv. 1855, p. 474.)

formed part of an inscription of Apepi, one of the kings of Avaris before the XVIIIth Dynasty, preserved in the British Museum (1101).

Lizards are to be seen in the hands of seated human figures painted on the outside of the coffin of Pachrat-Heru-A-Usheb, in the British Museum (6666); these lizards are represented with swollen feet: and a similar lizard is found on the inner coffin of a priestess of Amen from Dêr-el-Bahari (24794 B.M.), held upwards by the tail in the hand of an erect hawk-headed human figure standing before a seated figure, apparently of Amen. It also occurs on the other side of this coffin, in the hands of similar hawk-headed figures. Evidently the same kind of lizard likewise appears in the hands of men in the tomb of Rameses III. Professor Flinders Petrie has shown me two figures of genii also holding lizards, from the north brick pyramid of Dahshur. There is a necklace in the British Museum consisting of a string of small red stone beads<sup>1</sup>, and between each bead hangs a gold pendant, about half an inch long, alternately in the form of a lizard and of a small oval. Whether these lizards were merely regarded as ornaments, or perchance as charms, it is impossible to say, but, in other necklaces, the sacred perch (*Lates niloticus*) also occurs as a pendant. The only lizard which all of these lizard-figures suggest to me is *Ptyodactylus*, which, from its striking characters, doubtless quite as much impressed the imaginations of the ancient Egyptians as it does those of the inhabitants of the Nile valley of the present day. As a frequenter of caverns and dark chambers, it may be that the hawk-headed figure holding it up by the tail represents Har-Hat, the guardian of temples.

<sup>1</sup> The necklace is among some Egyptian ornaments, but no number is visible.

## HEMIDACTYLUS.

*Hemidactylus*, Cuv. Règ. An. ii. 1817, p. 47; Gray, Ann. Phil. x. (2) 1825, p. 199.

Basal portion of the digits expanded into an oval disk, formed below by two rows of transverse lamellæ separated from each other by a median sulcus; distal portion of digits slender, the second phalanx rising from the middle of the disk; digits clawed, free or somewhat webbed at the base. Pupil vertical. Præanal or femoral pores present in the male.

## HEMIDACTYLUS FLAVIVIRIDIS, Rüppell. (Plate V. fig. 5.)

*Hemidactylus flaviviridis*, Rüppell, Neue Wirbelth. 1835, p. 18, pl. vi. fig. 2; Dum. & Bibr. iii. 1836, p. 347; Strauch, Mém. Ac. St. Pétersb. (vii.) xxxv. no. 2, 1887, p. 33; Matschie, Sitz.-Ber. Ges. nat. Freund. 1893, no. 1, p. 29; Anderson, Proc. Zool. Soc. 1895, p. 642; Herpet. Arabia & Egypt, 1896, pp. 26, 98.

*Hemidactylus coctæi*, D. & B. iii. 1836, p. 365; Cantor, Journ. As. Soc. Beng. xvi. pt. ii. 1847, p. 629; A. Dum. Cat. Rept. Mus. Hist. Nat. Paris, 1851, p. 39; Günther, Rept. B. Ind. 1864, p. 109; Ann. Mag. N. H. (4) ix. 1872, p. 86; Proc. Zool. Soc. 1875, p. 226; Steindachner, Novara Rept. 1867, p. 13; Theobald, Journ. As. Soc. Beng. xxxvii. pt. ii. extra no. 1868, p. 29; Stoliczka, Journ. As. Soc. Beng. xli. pt. ii. 1872, p. 98; Blanford, Proc. Zool. Soc. 1876, p. 636; Journ. As. Soc. Beng. xlv. pt. ii. 1876, p. 18; id. op. cit. xlviii. pt. ii. 1879, p. 125; Klunzinger, Zeitsch. Ges. Erdk. Berl. xiii. 1878, p. 94; Murray, Zool. Sind, 1884, p. 359; Blgr. Cat. Liz. B. M. i. 1885, p. 137; op. cit. iii. 1887, p. 485; Ann. & Mag. N. H. (5) xx. 1887, p. 407; Fauna Brit. Ind., Rept. & Batr. 1890, p. 92; Ann. Mus. Civ. Genova, ser. 2, xvi. (xxxvi.) 1896, p. 550; Parenti e Picaglia, Rett. ed Anfibi Mar Rosso, 1886, p. 14; Strauch, Mém. Ac. St. Pétersb. (vii.) xxxv. 1887, p. 33; Boettger, Ber. Offenb. Ver. xxix.-xxxii. 1892, p. 62; Kat. Rept. Mus. Senck. 1893, p. 29; Flower, Proc. Zool. Soc. 1896, p. 865.

*Boltalia sublevis*, Gray, Zool. Misc. 1842, p. 58.

*Hoplopodion coctæi*, Fitzinger, Syst. Rept. 1843, p. 104.

*Hemidactylus bengaliensis*, Anderson, Journ. As. Soc. Beng. xl. pt. ii. 1871, p. 14.

1. Suez. Rev. Walter Statham.

2. Suakin. Surgeon-Captain R. H. Penton, D.S.O.

3. Suakin. British Officers' Mess House.

Head rather short and broad, forehead concave; the length of the snout exceeds the distance between the eye and the ear by the width of the ear; ear-opening oval, slightly oblique, and about half the diameter of the eye. Rostral nearly twice as broad as high, with a median furrow above; nostril defined by the rostral, first labial, and 3 nasals, but, in some instances, the rostral is excluded; 12 to 16 upper, and 9 to 11 lower labials. Mental much broader than the rostral, triangular, with a large chin-

shield on each side of it broadly in contact with its fellow, with one or two small shields behind. Limbs and digits well developed; 8—10 prominent lamellæ on the pollex and hallux; on the remaining digits of both extremities the lamellæ vary from 10 to 13, the distal ones of the manus and the distal and proximal plates of some of the digits of the toes being occasionally undivided. Body uniformly granular, the granules smallest on the vertex, increasing in size on the snout, and largest on the sides, where there are a few generally larger than the others, and sometimes a large tubercle before the shoulder, and a few rounded tubercles on the sacral region; abdominal scales cycloid, imbricate, and larger than the lateral granules. Tail generally longer than the head and body, depressed, flat below, consisting of a series of verticils, each of which is made up of about 13, more or less, transverse series of granules, with a large tubercle on the upper surface, external to each side of the mesial line, and with another still larger at the lower angle, both of these tubercles being placed close to the posterior borders of the verticils; a longitudinal line of large transverse plates on the under surface. 6 or 7 femoral pores (5–9 in Bengal specimens).

In life the general colour of Suakin specimens is pale lemon-yellow with a faint greenish-grey tinge, the underparts being of a richer lemon and the lamellæ clear silvery white. On the back, there are occasionally faint indications of the presence of dark transverse undulating bands.

*Measurements of Specimens (in millim.).*

	Suez.	Suakin.	Suakin.	Suakin.	Hadramut.
Snout to vent.....	59	66	72	74	82
Vent to tip of tail.....	70	63	83	85	92
Length of head.....	18.5	19	20.5	21	22
Width of head.....	13.2	13.7	17	16	18
Length of fore limb.....	25	26	31.2	30	34.5
„ hind limb.....	28.5	31.7	34.3	37	40
Femoral pores.....	L. 7	6	7	6	6
	R. 7	7	6	6	7

The largest specimen of this species as yet on record was obtained at Pinang. The body and head were a fraction more than 94 millim. in length, and the tail close on 83 millim. long; but from the accompanying table it will be seen that although there is not much difference between the total length of the Pinang specimen and the one



from the Hadramut, the length of the latter is largely due to the length of its tail, and that its head and body are actually 13 millim. shorter than the Pinang individual.

It is common in houses at Suez and Suakin, and occurs also at Kosseir. In Egypt it has never been observed as yet in any inland town.

It is generally seen after sundown hunting for insects on the walls, but I have seen it similarly occupied inside houses in the middle of the day. When disturbed it emits a sound which can only be described as a kind of squeak.

Although the lamellæ are arranged in two lateral groups, they begin distally by a single lamella, and in the first digit of the hind foot they, as a rule, end proximally in two azygos lamellæ in the mesial line, and in the fifth digit of the same foot in one.

The following is the arrangement of the paired lamellæ taken from one individual, beginning with the first digit:—

Fore foot . . . . .	7	9	10	10	9
Hind foot . . . . .	5	10	11	10	8

In only two of the individuals obtained by me are the femoral pores symmetrically arranged. Seven is the highest and six the lowest number, but in India there may be as many as nine and as few as five pores.

The colour of this lizard, according to Dr. Stoliczka, "changes very rapidly during life; sometimes the transverse bands turn almost to blackish brown, and another time they become quite obsolete."

The species was first described by Rüppell from specimens obtained at Massowah; but in the following year, 1836, Duméril and Bibron redescribed it as *H. coctæi*, from specimens received by them from Bengal and Bombay. Some years ago, Mr. Boulenger examined the types of *H. flaviviridis*, Rüppell, preserved in the Frankfort Museum, and arrived at the conclusion that they were identical with *H. coctæi*. Prof. Boettger, with a specimen of the so-called *H. coctæi* from Bombay and the types of this species before him, arrived at a similar result, which likewise happened in my case, when I compared the foregoing specimens together, in 1893, being at the time quite unaware of Mr. Boulenger's and Prof. Boettger's observations.

Duméril and Bibron in their description of the genus *Hemidactylus*<sup>1</sup> direct attention to Rüppell's *H. flaviviridis*, which they say appeared to them to be distinct from all of the species described in their third volume; but at the same time they do not include it as a species, and add that it ought to occupy a place alongside of *H. coctæi*, because "ce Saurien lui ressemble par la forme de ses doigts et de sa queue, aussi bien que par les écailles uniformes que revêtent les parties supérieures de son corps."

It is thus quite evident that their term *H. coctæi* must give precedence to *H. flaviviridis*.

To Massowah, Bengal, and Bombay, Cantor, in 1847, added Pinang as another

<sup>1</sup> Erpét. Gén. iii. 1836, p. 347.

locality in which it was found; and Günther, in 1864, mentioned its presence at Patna. Steindachner, in 1867, described a specimen from Calcutta. Dr. Stoliczka, in his account of the distribution of the Indian and Burmese species of *Hemidactylus*, written in 1872, mentioned that this species was spread over the entire Gangetic delta and extended eastwards to the Khasia Hills, Cachar, northwards to Sikkim, through Western Bengal, the North-west Provinces of India up to the foot of the hills at Kangra and Hardwar, and westwards to the Punjab. He also stated that he had seen two specimens said to have come from Pegu. Mr. Blanford, in 1876, recorded it from Sind, and, in 1879, included it in a list of some reptiles from Ajmere in Rajputana. In 1878, Dr. Klunzinger met with it at Kosseir on the Egyptian coast. Mr. J. Murray, in 1884, stated that it occurred in the Deccan, Concan, Cutch, Quetta, and Baluchistan, and, in 1885, Mr. Boulenger recorded it from Ellore, and, in 1887, from Maskat in Arabia. In 1892, Prof. Boettger added Aden as another Arabian locality; and in the following year my collector brought back a specimen from near the seaport of Makulla, also in Arabia. In the same year I found it to be the common house-gecko of Suez, and in the following year that it was equally prevalent at Suakin. Within the last few years it has also been found at Jask and Fao, on the Persian Gulf, and recently it has been recorded by Mr. Boulenger from Ghinda, in Eritrea.

#### HEMIDACTYLUS TURCICUS, Linn. (Plate V. fig. 3.)

*The Small Spotted Grey Lizard*, Edwards, Nat. Hist. Birds, pt. iv. 1751, pl. 204.

*Lacerta turcica*, Linn. Syst. Nat. i. 1766, p. 362.

*Gecus cyanodactylus*, Rafinesque, Carat. nuovi gen. e nuove sp. An. Sicilia, 1810, p. 9.

*Gecko meridionalis*, Risso, Hist. Nat. Europ. Mérid. iii. 1826, p. 87.

*Hemidactylus triedrus*, Fitz. N. Class. Rept. 1826, p. 46; Bonap. Fauna Ital. ii. Rett. ed Anfibi, 1832-41, plate; Steindachner, Novara Rept. 1867, p. 12.

*Hemidactylus granosus*, Heyden, Rüppell's Atlas nördl. Afr., Rept. 1827, p. 17, pl. v. fig. 1.

*Hemidactylus robustus*, Heyden, l. c. pp. 19-20; Rüppell, l. c. p. 300.

*Gecko verruculatus*, Cuv. Règ. An. nouv. éd. ii. 1829, p. 54.

*Hemidactylus verrucosus*, Gray, Syn. Griffith's An. Kingd. ix. 1831, p. 50; Rüppell, Mus. Senck. iii. 1845, p. 300.

*Hemidactylus verruculatus*, Bibron et Bory de St. Vincent, Expéd. Sc. Morée, Rept. 1833, p. 68, pl. xi. fig. 2; *part.*, Dum. & Bibr. iii. 1836, p. 359; Fitzinger, Syst. Rept. 1843, p. 105; Guichenot, Explor. Sc. de l'Algérie, Sc. Phys. Zool. v. 1850, p. 4; Duméril, Cat. Rept. Mus. Paris, 1851, p. 39; Peters, Mon. Berl. Ac. 1862, p. 271; Steindachner, Ins. Cypern, Unger & Kotschy, 1865, p. 572; De Betta, Faun. Ital. pt. 4, Rett. ed Anfibi, 1874, p. 20; Schreib. Herp. Europ. 1875, p. 487; Gasco, Viaggio in Egitto, pt. ii. 1876, p. 110; Bosca, Ann. Hist. Nat. Madrid, vi. 1877, p. 48; Klunzinger, Zeitschr. Ges. Erdk. Berl. xiii. 1878, p. 94;

- Bedriaga, Bull. Soc. Nat. Moscou, 1879, no. 3, p. 35; Boettger, Zeitschr. ges. Naturw. Berl. (Giebel) (2) iv. 1879, p. 511; Ber. Senck. nat. Ges. 1880, p. 192; Abh. Senck. nat. Ges. xii. 1881, p. 381; Vaillant, Réveil, Faune et Flore Pays Comalis, 1882, p. 16; Lortet, Arch. Mus. Lyon, iii. 1883, p. 187; Reichenow, Sitz.-Ber. Ges. nat. Fr. Berl. 1883, p. 149; Tristram, West. Palest., Rept. & Batr. 1884, p. 153; Giglioli, Ann. Mus. Civ. Genova, ser. 2, vi. 1888, p. 65. *Gecko (Hemidactylus) verruculatus*, Gervais, Ann. Sc. Nat. sér. 2, vi. 1836, p. 309.
- Hemidactylus maculatus*, Gervais, Ann. Sc. Nat. sér. 3, x. 1848, p. 205.
- Hemidactylus cyanodactylus*, Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 23.
- Hemidactylus turcicus*, Boettger, Ber. Senck. nat. Ges. 1878-79, p. 74; Kobelt, Reiseber. Algerien und Tunis, 1885, p. 464; Kat. Rept. Mus. Senck. 1893, p. 28; Boulenger, Cat. Liz. B. M. i. 1885, p. 126; op. cit. iii. 1887, p. 485; Trans. Zool. Soc. xiii. 1891, p. 115; Ann. Mus. Civ. Genova, ser. 2, xvi. (xxxvi.) 1896, p. 550; Parenti e Picaglia, Rett. ed Anfibi Mar Rosso, 1886, p. 13; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) xxxv. no. 2, 1887, p. 32 (not specim. 4826 = *sinaita*); Werner, Verh. zool.-bot. Ges. Wien, xliii. 1893, p. 359; op. cit. xlv. 1894, p. 77; Peracca, Boll. Mus. Zool. Torino, ix. no. 167, 1894, p. 6; Anderson, Herpet. Arabia & Egypt, 1896, pp. 26, 98.
- 2 ♀. Maryut District, west of Alexandria.
- 2 ♀. Houses, Alexandria.
- 1 ♂. Shaluf, Suez.
- 1 ♀. Mokattam Hills. Dr. Walter Innes.
- 1 ♀. Edfu, Upper Egypt.
- 1 ♂. Wādī Halfa.
- 2 ♂ and 3 ♀. Suakin. Surgeon-Captain R. H. Penton, D.S.O.
- 2 ♂ and 2 ♀. Island of Shadwan, Gulf of Suez. Mr. John Strathearn.
- 3 ♀. Ras Gharib. Mr. James Robertson.

Head oval. Snout rounded, its length generally exceeds the distance between the eye and the ear; the diameter of the eye more than half the distance between the eye and the ear; the latter oblique in position, irregularly oval, and not quite half the diameter of the eye. Rostral considerably broader than high, grooved above; nostril formed by the rostral, first labial, and 3 nasals. Upper labials vary from 7 to 10, 8 and 9 being the prevalent numbers; lower labials 6 to 9, 7 being the most common number. Mental large, generally triangular; a large chin-shield on either side of it, the two broadly in contact behind it, and a small shield on the outside of each. Limbs and digits of moderate length; 6 to 8 lamellæ on the pollex and hallux, the prevailing numbers on each being 7, 6 being very exceptional on the pollex, but common on the hallux; 8 to 10 lamellæ on the fourth finger, the former number being most prevalent; 9 to 11 lamellæ on the fourth toe, 10 being the most common number, and 11 more frequent than 9. The front of the head covered with large granules, and the back part with much smaller granules, with scattered round tubercles. The upper surface of the body covered with minute granules, having 14 to 16 more or less longitudinal rows of oval or trihedral keeled tubercles, somewhat varying in size and larger than the interspaces between them. Upper surface of the fore limb covered with slightly

imbricate scales, with large tubercles on the radial portion; hind limb with granules and intermixed large tubercles. Abdominal scales small, smooth, imbricate, rounded or hexagonal. Tail longer than the body and head, variable, somewhat depressed at the base, cylindrical beyond, and tapering to a fine point, covered with minute scales arranged in feeble verticils and with transverse rows of keeled tubercles; under surface covered with more or less transversely enlarged plates. Four to ten præanal pores, exceptionally two.

Colour light brown, greyish, sandy yellow or pink above. In the dark specimens of the Mediterranean coast-line and from along the banks of the Freshwater Canal at Suez, and in those from the Nile valley, the body and head are covered with dark blackish-brown spots and markings, the spots generally involving a number of tubercles or single tubercles, many of the tubercles being white. Occasionally the dark markings on the body tend to form transverse bands; a dark brown band from the eye to the snout and from the eye along the temporal region, sometimes broken up into spots. Underparts white. The geckos from Ras Gharib and from the island of Shadwan conform to the general colour of their surroundings and have a pinkish tinge, the markings being obsolete or nearly so, while those from Tor in the Sinaitic Peninsula are greyish pink.

The following are the measurements of the largest females in my collection:—Snout to vent 59 millim., tail 64 millim.; snout to vent 56 millim., tail 67 millim.

It will be observed from the foregoing list of specimens that I obtained only two from up the Nile, viz. from Edfu and Wádí Halfa. I never observed it myself in the neighbourhood of Cairo; but it is found there, as I am indebted to Dr. W. Innes for a specimen from the Mokattam Hills. It is more plentiful along the sea-face of the delta, from Maryut to the east, and is occasionally found around Suez. Mr. John Strathearn informs me that it is not uncommon on the island of Shadwan; and as Mr. James Robertson was so good as to send me three specimens from the neighbourhood of the lighthouse of Ras Gharíb, it seems to be well represented there. It is common at Suakin.

The specimens captured at Maryut were found under stones amid the ruins of Said Pasha's palace, and those at Alexandria in a house; while the one from Shaluf I came across in digging out a *Nesokia* from its burrows among grass on the banks of the Freshwater Canal.

Besides its circum-Mediterranean distribution, the African portion of which extends from Algeria (*Gervais, Guichenot, &c.*) through Cyrenaica (*Reichenow*) to Egypt (*Gray*), it spreads southwards along the Nile valley to Sennaar (*Peters*), Abyssinia (*Heyden*), Somaliland (*Vaillant*), Eritrea, Assab (*Giglioli* and *Boulenger*), northwards along the coast of Egypt. It occurs also in the Sinaitic Peninsula (*Werner* and *Anderson*), Arabia Petræa (*Rüppell*), Hadramut (*Anderson*), Persia (*Boulenger*), Baluchistan (*Boulenger*), Sind (*Murray* and *Boulenger*).



## Var. SINAITA. (Plate V. fig. 4.)

*Hemidactylus turcicus*, Strauch, Mém. Acad. St. Pétersb. (vii. sér.) xxxv. no. 2, 1887, p. 32 (specim. 4826 only).

*Hemidactylus sinaitus*, Blgr. Cat. Liz. B. M. i. 1885, p. 126; Proc. Zool. Soc. 1895, p. 532; Ann. Mus. Civ. Genova, ser. 2, xvii. (xxxvii.) 1897, p. 277; Anderson, Proc. Zool. Soc. 1895, p. 639; Herpet. Arabia & Egypt, 1896, p. 98.

1 juv. Wádí Halfa. Major Henry d'Alton Harkness.

4 ♂, 3 ♀, and 1 juv. Suakin. Surgeon-Captain R. H. Penton, D.S.O.

5 ♂ and 4 ♀. Suakin.

1 ♂ and 4 ♀. Durrur.

In the lizard which Mr. Boulenger described from the Sinaitic Peninsula as *H. sinaitus* the nostril is formed by the rostral and three nasals, the first labial being excluded. In my collection there are 26 specimens from Suakin and Durrur that agree with it.

Twenty-two of them have the nostril defined only by the rostral and three nasals, but in four the first labial enters into the nostril.

Mr. Boulenger has also described from Western Somaliland two specimens, which he referred to *H. sinaitus*, in which the first labial is excluded by a small shield.

In describing a collection of reptiles from Aden, brought together by Colonel Yerbury, I referred six geckos to *H. sinaitus*, but only in one of them was the first labial excluded on both sides of the head, while in one it entered on one side and did not do so on the other. In the remaining four specimens, the first labial shield entered as a minute point, but in so doing produced a nostril structurally identical with the nostril of *H. turcicus*. It is thus evident that the nostril in *H. sinaitus* is subject to variation, but at the same time the rule is for the first labial to be excluded.

In the type of *H. sinaitus* there are no enlarged subcaudals, and they are also absent in the generality of the Suakin and Durrur geckos; but individuals from these localities are met with, as also in the Aden lizards, in which the subcaudals are only slightly transversely enlarged, whereas three of the Aden specimens and two from Western Somaliland have enlarged subcaudals as in *H. turcicus* (Pl. V. fig. 3). But Professor Giglioli states that in Italian examples of *H. turcicus* these plates are occasionally but little enlarged.

The dorsal tubercles of *H. sinaitus* are somewhat smaller than those of *H. turcicus*, and in this respect they resemble the Eastern Sudan specimens and those from Aden; but in those from the latter locality, some are even smaller than in the type, whereas in the Western Somaliland geckos they are quite as large as in *H. turcicus*.

The following table shows the distribution of the lamellæ in *H. turcicus* and in its variety *sinaita* :—

*Distribution of lamellæ on digits of Hemidactylus turcicus.*

Pollex.						Hallux.						
No. of lamellæ.	No. of lamellæ.	No. of lamellæ.	No. of lamellæ.	No. of lamellæ.	No. of lamellæ.	No. of lamellæ.	No. of lamellæ.	No. of lamellæ.	No. of lamellæ.	No. of lamellæ.	No. of lamellæ.	No. of lamellæ.
5	6	7	8	9	10	5	6	7	8	9	10	11
Present on ..	Present on 1	Present on 18	Present on 8	Present on ..	Present on ..	Present on ..	Present on 9	Present on 13	Present on 3	Present on ..	Present on ..	Present on ..
27 specimens.						25 specimens.						
Fourth finger.						Fourth toe.						
			15	11	1				5	15	8	
27 specimens.						28 specimens.						

*Distribution of lamellæ on digits of H. turcicus, var. sinaita.*

Pollex.				Hallux.				
5	8	10	2	14	7	2	1	
25 specimens.				24 specimens.				
Fourth finger.				Fourth toe.				
	9	16			2	9	13	1
25 specimens.				25 specimens.				

It will be observed that in the specimens of *H. turcicus* that have come under my observation the number of lamellæ never falls so low as five, six being the lowest number; whereas in *sinaita* one-fifth of the specimens have five lamellæ on the pollex, and more than one-half have five on the hallux. In *H. turcicus* the lamellæ vary from 6 to 8, and in its variety *sinaita* from 5 to 8. In both, 7 is the most prevalent

number on the pollex. Six is exceptionally present in *H. turcicus* on the pollex, but it is common in *sinaita*; whilst 8, which is not uncommon in the former, is so in the latter. On the fourth finger the lamellæ of *H. turcicus* vary from 8 to 10, and in *sinaita* from 7 to 8. The latter number is the most prevalent in both.

On the hallux of *H. turcicus* the lamellæ vary from 6 to 8, and in *sinaita* from 5 to 8; the most prevalent number in the former being 7, and in the latter 5.

On the fourth toe in *H. turcicus* the lamellæ vary from 9 to 11, and in *sinaita* from 8 to 11. In both 10 is the most prevalent number.

In six males of *H. turcicus* from Egypt, the præanal pores range from 6 to 8, the numbers being 5, 6, 6, 7, 7, 8; but in 14 examples of var. *sinaita* from the Eastern Sudan they vary from 2 to 5, only one has 2, two have 5, and the remainder have 4; whereas in one from Western Somaliland there are 6 præanal pores.

In view of how the supposed characters of *H. sinaitus* have broken down with the investigation of additional material, it is not entitled to more than varietal rank, based chiefly on the differences observable in the lamellæ, and more or less in the formation of the nostril.

It is found in the Sinaitic Peninsula, Aden and its neighbourhood, Western Somaliland, and the Eastern Sudan to Kosseir (*Klunzinger*).

The native name for this species is simply بَرَص, or *bors*.

## TARENTOLA.

*Tarentola*, Gray, Ann. Phil. (2) 1825, p. 199.

Digits free, dilated, their under surfaces with undivided transverse lamellæ; only the third and fourth digits with claws. Pupil vertical. Neither femoral nor præanal pores.

TARENTOLA MAURITANICA<sup>1</sup>, Linn. (Plate VIII. figs. 1 & 2.)

*Lacerta mauritanica*, Linn. Syst. Nat. i. 1766, p. 361.

*Gecko muricatus*, Laur. Syst. Rept. 1768, p. 44.

*Stellio mauritanicus*, Meyer, Syn. Rept. 1795, p. 31.

*Gecko fascicularis*, Daud. Rept. iv. 1803, p. 144; Licht. Doubl. Berl. Mus. 1823, p. 103.

*Gecko stellio*, Merr. Syst. Amph. 1820, p. 43.

*Tarentola stellio*, Gray, Ann. Phil. (2) x. 1825, p. 199.

*Gecko mauritanica*, Risso, Hist. Nat. Europ. MÉR. iii. 1826, p. 87.

*Platydictylus fascicularis*, Wagler, Syst. Amph. 1830, p. 142; Gray, Syn. Griffith's An. Kingd. ix. 1831, p. 48.

*Platydictylus muralis*, D. & B. iii. 1836, p. 319; Guichenot, Explor. Sc. Alg., Phys. Zool. v. 1850, p. 4; Steindachner, Unger & Kotschy, Cyprien, 1865, p. 572; Gasco, Viagg. Egitto, pt. ii. 1876, p. 110.

*Gecko (Platydictylus) fascicularis*, Gervais, Ann. Sc. Nat. sér. 2, vi. 1836, p. 309.

*Ascalabotes mauritanicus*, Bonap. Faun. Ital. 1832-41, plate; Amph. Europ. 1839, p. 28; Bosca, An. Hist. Nat. Madrid, vi. 1877, p. 47.

*Platydictyla (Tarentola) fascicularis*, Gray, Syn. Griffith's An. King. ix. p. 48.

*Ascalabotes fascicularis*, Fitz. N. Class. Rept. 1826, p. 47; Syn. Rept. 1848, p. 102.

*Tarentola mauritanica*, Gray, Cat. Liz. B. M. 1845, p. 164; Tristram, Proc. Zool. Soc. 1859, p. 476; Boettger, Abh. Senck. natur. Ges. ix. 1873-75, p. 136; Abh. Senck. nat. Ges. xii. 1881, p. 380; Kobelt, Reiseerinnerung. Alg. und Tunis, 1885, p. 464; Peters, Mon. Berl. Ak. 1880, p. 306; Boulenger, Cat. Liz. B. M. i. 1885, p. 196; op. cit. iii. 1887, p. 489; Trans. Zool. Soc. xiii. 1891, p. 115, pl. xiii. fig. 3; Ann. Mag. N. H. (6) xii. 1893, p. 204; Werner, Verh. zool.-bot. Ges. Wien, xlii. 1892, p. 351; op. cit. xlv. 1894, p. 77; Anders. Herp. Arabia & Egypt, 1896, pp. 78, 99.

*Platydictylus facetanus*, Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 22; Schreiber, Herp. Europ. 1875, p. 490; Bedriaga, Bull. Soc. Imp. Nat. Moscou, 1879, no. 3, p. 35; Zeitschr. ges. Naturw. (Giebel) (2) iv. 1879, p. 510.

*Platydictylus mauritanicus*, Boettger, Abh. Senck. nat. Ges. ix. 1874, p. 16; Ber. Senck. nat. Ges. 1880, p. 193; De Betta, Faun. Ital., Rett. ed Anfibi, 1874, p. 19; Tristram, West. Palest., Rept. & Batr. 1884, p. 153.

*Tarentola facetana*, Strauch, Mém. Ac. St. Pétersb. (vii. sér.) xxxv. no. 2, 1887, p. 21.

<sup>1</sup> I have figured a specimen with a renewed tail, as it is the largest in my collection, and, but for this blemish, is highly characteristic.





TARENTOLA MAURITANICA. Fig. 1, ♂, Marsa Matru ; Fig. 2, Houses, Cairo.

TARENTOLA ANNULARIS. Fig. 3, ♂, Suakin.



1. Cairo. Dr. Walter Innes.
7. Abukir, on the walls of old windmills.
1. Mandara, east of Alexandria. Dr. Walter Innes.
2. Ramleh, east of Alexandria.
1. El Khreit, to the west of Lake Mareotis.
12. Marsa Matru, 150 miles to the west of Alexandria.

Body short and stout, depressed. Head depressed; snout as long as or slightly exceeding the interval between the eye and the ear; a supraorbital bone; ear devoid of conical tubercles at its anterior margin; eight or nine upper and seven to ten lower labials, the last of the former minute; nostril generally defined by the rostral, first labial, and three nasals; rostral twice as broad as high; breadth of the mental about two-thirds of its length; chin-shield on each side in contact with the labials. Upper surface of the head from the occiput forwards is covered with polygonal, convex, more or less tubercular granules, and the temporal region with scattered large keeled tubercles; behind the ear and on the sides of the neck and body there are prominent tubercular rosettes, each consisting of a large keeled tubercle with some small ones around it, the tubercles on the middle of the back consisting of about three rows of large and strongly keeled sessile tubercles; all the dorsal tubercles are arranged in transverse series, while those on the upper surface of the limbs are irregularly distributed; the interspaces between the tubercles are occupied by fine granular scales. Scales of the under surface flat, hexagonal, and slightly imbricate. Tail with broad well-marked verticils, margined with strong, backwardly directed, large, sharply conical tubercles. Thirteen lamellæ on pollex and hallux, and twelve on the fourth digit.

General colour yellowish brown or pale sandy yellow, occasionally marbled more or less with darker, or with short dark transverse dorsal bands, six in number, rare in Egyptian specimens, which, however, have generally indications of a dark line from the snout to behind the ear, with dark lines on the upper surface of the head, and the labials feebly dark-spotted. Tail generally barred brown and yellowish towards its end. Underparts whitish.

Measurements of an adult: snout to vent 77 millim., tail 78.

I have not observed this species to the south of Cairo, but it is quite possible that it may occur there. It is, however, essentially a species of the semi-desert and desert land along the sea-face of the delta; but it is not nearly so common as *T. annularis* is in the Nile valley proper. Its range extends eastwards to Arabia and westwards to Mogador, and may be said also to embrace the shores of the Mediterranean.

It is generally found under stones, on old walls, and occasionally in inhabited houses. I caught it during the daytime on the stone walls of old windmills at Abukir.

## TARENTOLA EPHIPPIATA, O'Shaughn. (Fig. 5.)

*Tarentola ephippiata*, O'Shaughn. Ann. Mag. N. H. (4) xvi. 1875, p. 263; Blgr. Cat. Liz. B. M. i. 1885, pp. 198, 414; Ann. Mag. N. H. (6) xii. 1893, p. 204; op. cit. (6) xvi. 1895, p. 166; Proc. Zool. Soc. 1896, p. 213; Ann. Mus. Civ. Genova, ser. 2, xvii. (xxxvii.) 1897, p. 277.

## 1. Durrur, north of Suakin.

Body short and stout, depressed; head depressed; snout rather broad, of variable length, in some (W. Africa) equalling the distance between the eye and the ear, and in others (E. Africa) exceeding it. A supraorbital bone. No denticulation in front of the ear. Nine or ten upper, and eight lower labials. Nostril formed by the rostral,

Fig. 5.

*Tarentola ephippiata*, O'Shaughn.

first labial, and two nasals. Rostral nearly twice as broad as high (W. Africa) or twice as broad as high (E. Africa); mental twice as long as broad at its middle, posteriorly pointed, with three chin-shields on each side, the outer one generally separated from the labials by a row of small shields, the innermost ones in contact, irregular in some. Head covered with large, juxtaposed, polygonal granules, very uniform in size,



three or four times as large as the body-granules, the largest on the snout, supraorbital and temporal regions, but on the latter area small granules are intermixed. The tubercles on the body generally and on the limbs are flat, oval, usually smooth, or occasionally feebly keeled. Ventral scales moderate, hexagonal, and imbricate. The anterior portion of the tail with rows of not very large tubercles. 12 or 13 lamellæ on the first digit and 14 or 15 on the fourth digit.

Uniform pale reddish or greyish brown, with a dark narrow band passing through the eye, along the neck to near the shoulder, the two streaks meeting or not meeting on the neck; the head with a few large dusky spots, and the body and tail with obscure dark transverse markings. Underparts white.

The following are the measurements of an adult West-African specimen given by Mr. Boulenger:—Snout to vent 63 millim., tail 59 millim.

The chin-shields of the specimen from Durrur are arranged irregularly. On one side there are two large shields external to the mental, the one lying in front of the other, the first being in contact with the first and part of the second labial, and the second solely with the second labial. On the other side the two chin-shields are arranged as in the West-African specimens.

This species was recorded for the first time from East Africa by Mr. Boulenger in his second account of the reptiles collected by Dr. Donaldson Smith in his expedition to Western Somaliland and the Galla country. It was obtained at Shaikh Hussein, West Somaliland, 5000 feet above the sea. My specimen was captured at Durrur, on the shore of the Red Sea.

It ranges across Africa from Senegambia (McCarthy Island) to Western Somaliland.

TARENTOLA ANNULARIS, Is. Geoffr. St.-Hil. (Plate VIII. fig. 3.)

*Gecko annularis*, Is. Geoffr. St.-Hilaire, Descr. Égypte, Hist. Nat. i. ? 1827, p. 130, pl. v. figs. 6 & 7.

*Gecko savignyi*, Aud. Descr. Égypte, Hist. Nat. i. ? 1829, p. 164, Suppl. pl. i. fig. 1.

*Platydictylus ægyptiacus*, Cuv. Règ. An. nouv. éd. ii. 1829, p. 53; Dum. & Bibr. iii. 1833, p. 322; Rüppell, Mus. Senck. iii. 1845, p. 300; Lefèbvre, Voy. Abyss. vi. Zool. (1845-50), p. 195, pl. ii. fig. 1; Gray, Syn. Griffith's An. Kingd. ix. 1831, p. 48; Peters, Mon. Berl. Ak. 1862, p. 271; Gasco, Viagg. Egitto, pt. ii. 1876, p. 110.

*Ascalabotes ægyptiacus*, Fitz. Syst. Rept. 1843, p. 102.

*Gecko ægyptiacus*, Griffith's An. Kingd. ix. 1831, p. 144.

*Tarentola ægyptiaca*, Gray, Cat. Liz. B. M. 1845, p. 165; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) xxxv. no. 2, 1887, p. 24.

*Tarentola annularis*, Blgr. Cat. Liz. B. M. i. 1885, p. 197; Ann. Mag. N. H. (6) xii. 1893, p. 204; Ann. Mus. Civ. Genova, ser. 2, xvi. (xxxvi.) 1896, p. 554; Boettger, Kat. Rept. Mus. Senck. 1893, p. 36; Anderson, Herpet. Arabia & Egypt, 1896, p. 99.

1. A house, Cairo. Dr. Walter Innes.
2. Pyramids of Gizeh.

2. Mariette Bey's house, Sakkâra.
2. Minia. Major R. H. Brown, R.E.
1. Tel el Amarna. Professor W. M. Flinders Petrie, D.C.L.
1. Luxor.
2. Colossi of Memnon, Thebes.
1. Rocks, banks of Nile, Assuan.
2. Rocks, banks of Nile, above First Cataract.
1. Wâdî Halfa. Surgeon-Captain R. H. Penton, D.S.O.
2. Suakin. Colonel Sir Charles Holled Smith, C.B., K.C.M.G.
4. Houses, Suakin. Henry Barnham, Esq., H.B.M. Consul, Suakin.
1. Rocks of Dehilba, Suakin plain.
3. Erkowit, near Suakin.
6. Houses, Suakin.
1. Durrur.
1. Gizeh. Dr. J. C. Mitchell.

Body short and depressed; head large, depressed and swollen across the temporal region; snout equalling or slightly shorter than the interval between the eye and the ear. A supraorbital bone; ear crescentic, nearly equalling the diameter of the eye, and with a denticulation at its anterior margin of conical scales. Ten or eleven upper and lower labials, the last upper labial usually small. Nostril generally defined by the rostral, first labial, and three nasals; rostral much broader than high, with a short median groove above; mental about twice as high as broad, widely separating the chin-shields, of which there are generally two or three on each of its sides in contact with the labials. Head, from the snout to the occiput, covered with rather large convex polygonal scales, among which rounded tubercles occur on the hinder part of the occiput and on the temporal region and cheeks. From the occiput backwards to the tail and the upper surface of the limbs covered with slightly convex rounded granules, with many intermixed large convex or rounded tubercles, those on the trunk being arranged in 8 to 10 longitudinal rows, the tubercles on the back being slightly less convex than those on the sides. Skin on the cheeks, neck, and sides of the body in folds. Scales of under surface flat, hexagonal, imbricate, smooth. Tail shorter than the body and head, in broad well-defined verticils, the posterior border of each defined by a transverse row of tubercles. Nineteen lamellæ on the pollex, twenty-one on the hallux, and twenty-two on the fourth digit.

Colour generally greyish brown, but very variable, depending on the surroundings of the lizard, being in some almost black, and in others nearly white. Five dark transverse bands across the back, sometimes almost resolved into pairs of spots; two pairs of round equidistant white spots over the shoulder, one behind the other; head occasionally with obscure dusky spots and a dark line through the eye to the sides of the neck, uniting with the first dark transverse band; labials dusky; under surface white or occasionally speckled with dusky on the throat and sides of the belly; tail

with dark markings like the trunk, but usually reduced to spots, and sometimes more or less margined with white.

Snout to vent 130 millim., tail 78 millim.

Generally found on rocks and ruins, but it also frequents houses. On the black rocks along the banks of the Nile, above the First Cataract, it is nearly black. Major R. H. Brown, R.E., sent me two specimens from Minia so white that I wrote and asked him if he could explain the pale colour, and he replied that they had been captured on a white-washed house—so much is the colour of these geckos influenced by their surroundings.

It is very common throughout the Nile valley, but I have not observed it in the northern part of the delta. It occurs in Abyssinia and in some of the islands off that coast (*Lefebvre* and *Boulenger*), and has been recorded from Eritrea (Ghinda) (*Boulenger*) and from Sennaar (*Peters*), also from the Sinaitic Peninsula.

Mr. Boulenger, in a synopsis of the genus, published in 1893<sup>1</sup>, recognized in all nine species, two of which, *T. americana*, Gray, and *T. cubana*, Gundl. & Peters, are from the New World (West-India Islands), the other four, besides the three here described, being from the Western and North-western portions of Africa.

The Arabic name of this gecko is أَبْرَصٌ أَسْوَدُ (ابري) = (*abu*) *bors aswad* = the black *bors*. It is known to the Hadendowahs as the *Dhān*.

<sup>1</sup> Ann. & Mag. N. H. (6 ser.) xii. Sept. 1893, p. 204.

## AGAMIDÆ.

## AGAMA.

*Agama, part.*, Daud. Hist. Rept. iii. 1802, p. 333.

Head triangular or cordate; tympanum distinct. Body more or less depressed; back sometimes feebly crested. Tail elongate, round or slightly compressed, irregularly or verticillately scaled. A gular pouch present or absent; a transverse gular fold and a pit before the shoulder. Præanal pores generally present in the male and occasionally in the female, but sometimes absent in both sexes.

Before describing the first species of this genus, it is necessary to arrive at an understanding of its synonymy and of the variations to which it is subject.

*Agama mutabilis*, Merrem, was founded on the lizard figured (figs. 3 & 4) on plate 5 of the 'Description de l'Égypte,' and Merrem's name was merely the Latin rendering of the French "*L'Agame variable ou Le Changeant*," the term under which it appeared in the plates of the foregoing work. The lizard represented on the plate in question has the fourth digit longer than all the others, so that there is no ground for the supposition that it could possibly have been a drawing made from an individual of the species afterwards described by Heyden as *A. sinaita*; moreover, Is. Geoffroy, in his description of *l'Agame variable*, clearly indicated the nature of its fingers, as he says, "les doigts vont en augmentant de longueur, à partir du premier jusqu'au quatrième." In *A. sinaita*, on the other hand, the fourth finger, so far from being the longest, is markedly shorter than the third.

The lizard figured by Is. Geoffroy corresponds to the individual (fig. 3) represented on Plate IX. of this work; whereas *A. sinaita*, Heyden (Pl. X. fig. 1), differs from it in its much longer limbs and in the proportions of its third and fourth digits to one another.

Is. Geoffroy described the scales of his lizard as being for the most part very small, and those on the back so fine as to be hardly distinguishable without the aid of a hand-lens, or at least only by the greatest attention. He also says that, although the scales are disposed as in the ordinary species of the genus *Agama*, *l'Agame variable*, unlike them, has no spines scattered over different parts of the body and none around the ear-opening or on the sides of the neck.

The only lizard in the British Museum which at all approaches Is. Geoffroy St.-Hilaire's description of *l'Agame variable* is a lizard from Egypt, presented many years ago to that institution by Sir J. Gardner Wilkinson. Dr. Gray regarded it as an example of "The Variable *Trapelus*," but placed along with it two other lizards from the same donor, which are undoubted examples of *A. pallida*, Reuss. Moreover, he regarded *l'Agame variable* as identical with *A. rudrata*, Olivier.



Mr. Blanford pointed out, in 1876<sup>1</sup>, that the last-mentioned species is the Persian form, distinct from what he designated as the Egyptian lizard, which he held would stand as *Trapelus mutabilis*, Merr. From Mr. Blanford's allusion to certain characters of the lizard he had in view, it would appear to have been *A. pallida*, and not *l'Agame variable* of Is. Geoffroy, which seems to be identical with *A. inermis*, Reuss.

Mr. Boulenger, in preparing the second edition of the British Museum 'Catalogue of Lizards,' had to deal with Sir J. G. Wilkinson's specimen; and not being able to identify it with any known species, he described it as new under the name *A. latastii*. I captured in the neighbourhood of the Pyramids of Gizeh a lizard distinctly referable to *A. latastii*. Mr. Boulenger describes the scales "as equal, rhomboidal, imbricate, smooth or indistinctly keeled . . . the size of which scarcely exceeds that of the ventrals," and the back of the head as having no spinose scales. The upper edge of the ear, however, he mentions has a fringe of 3 or 4 pointed scales. In the Gizeh specimen (Pl. IX. fig. 3) corresponding to *A. latastii* the fringe on one side of the head has the scales so small and so little pointed that they are only just visible to the naked eye.

These two specimens appear to me to correspond to *A. mutabilis*, Merr. They are both females, and I believe them to be inseparable from the lizard described by Reuss as *A. inermis*. I have arrived at this conclusion after having compared them with a male lizard captured at Gizeh, and submitted to Prof. Boettger for comparison with the types of *A. inermis* preserved at Frankfort. He pronounced it to be specifically identical with *A. inermis*, but since then I have been enabled, thanks to his courtesy, to compare them myself, and I have come to the same conclusion. The individual compared with the type at Frankfort is represented by fig. 1, Pl. IX. I have also examined the types (two males) of *A. gularis*, Reuss, both of which are specifically identical with *A. inermis*, an opinion which is also held by Professor Boettger.

In the two females (= *A. latastii*) to which I am specially referring the body-scales are small, rhomboidal, imbricate, nearly equal, smooth or feebly keeled, with a few faintly enlarged, obtusely keeled scales scattered sparsely among the small scales; whereas in the types of *A. inermis*, corresponding to fig. 1, Pl. IX., the scales are more unequal and more sharply carinate. The inequality is such that some of the scales are distinctly larger than the others, strongly keeled, and irregularly scattered among them. These larger scales, however, are foreshadowed by the faintly enlarged scales observed here and there, but very feebly developed, in the two females of *A. latastii*. Beyond these trivial differences there is not a single character by which they can be separated. The finest form of lepidosis is that illustrated by the two females which I consider can be reasonably regarded as examples of *A. mutabilis*, Merrem. The next modification is met with in those lizards from Gizeh which come under Reuss's description of *A. inermis*. There are, however, further instances of variation, in which the scales

<sup>1</sup> East. Persia, Geol. & Zool. ii. 1876, p. 316; Journ. As. Soc. Beng. xlv. pt. ii. 1876, p. 23.

become more strongly carinated and irregular. The most extreme example in this direction is found in specimens from the coast-line of the delta of the Nile. When I first met with it I provisionally regarded it as worthy of recognition as a distinct variety. Since then, however, my materials have increased, and in reviewing them, along with the specimens in the British Museum, I find that, although these deltaic specimens are at first sight strikingly dissimilar to typical *A. mutabilis*, the extremes are bridged over by intermediate variations.

Lataste collected in the Algerian Sahara, at Hadjira, examples of this species, in which the dorsal scales are very markedly larger than those on the sides, so much so that they form a dorsal area by themselves; but he also found at Tibremt, in the same region, others in which the dorsal scales are not sharply marked off from those on the sides, but some are larger than others, strongly keeled and mucronate. All of them approach the specimens from the littoral area of the Nile delta, and probably correspond to the lizards from the Algerian Sahara referred by Strauch<sup>1</sup> to *A. ruderata*, Olivier, and, possibly, are the equivalents of the lizards from the same region recently described by Dr. Franz Werner<sup>2</sup> as *A. aspera*. Specimens presenting the same characters as M. Lataste's Tibremt examples of the species were obtained by me some years ago at Biskra<sup>3</sup>. They had been collected between that health-resort and Tuggurt. From Duiat, on the Eastern Tunisian confines of the Algerian Sahara, my Arab collector brought back almost similar specimens. The lizards from Benghazi, in Cyrenaica, and those from the oasis of Kufra, in the Sahara, collected by Gerard Rohlfs and Dr. A. Stecker, and recorded by Peters<sup>4</sup> under the name of *A. ruderata*, are doubtless examples of this species.

#### AGAMA MUTABILIS, Merrem. (Plate IX.)

*L'Agame variable ou Le Changeant*, Is. Geoffr. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, pp. 127-129, pl. 5. figs. 3 & 4; Cuv. Règ. An. 1817, p. 35.

*Agama mutabilis*, Merrem, Tent. Syst. Amph. 1820, p. 50; Is. Geoffr. St.-Hil. l. c. pp. 127-129; *part.*, D. & B. iv. 1837, p. 505; *part.*, Rüpp. Mus. Senck. iii. 1845, p. 302; ? Gasco, Viagg. Egitto, pt. 2, 1876, p. 106; Lataste, Le Natur. 1880, p. 325; Anderson, Herp. Arabia & Egypt, 1896, p. 100.

? *Agama deserti*, Licht. Doubl. Berl. Mus. 1823, p. 101.

*Tropelus ægyptius*, Cuv. Règ. An. nouv. éd. ii. 1829, p. 37.

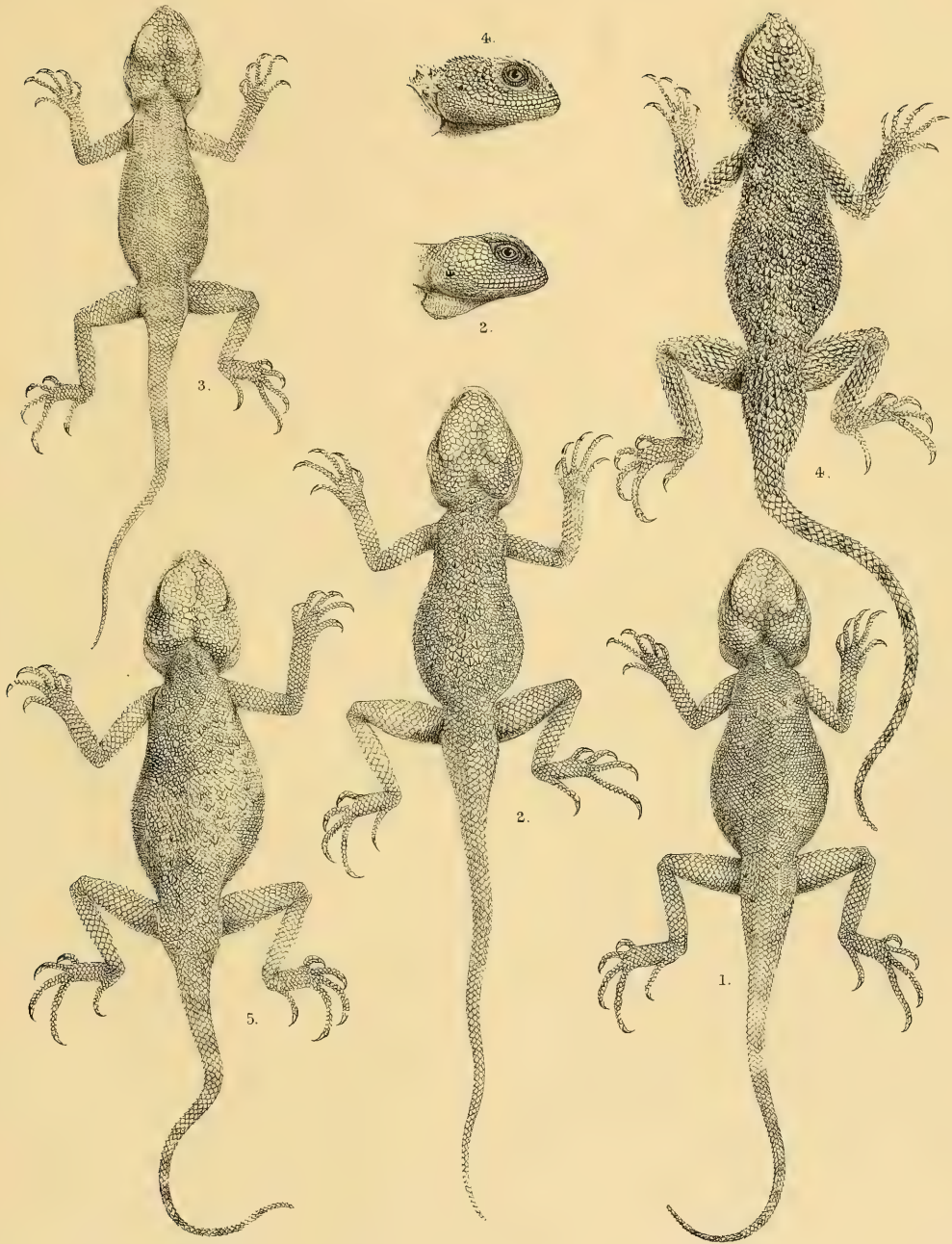
*Agama inermis*, Reuss, Mus. Senck. i. 1834, p. 33; Blgr. Cat. Liz. B. M. i. 1885, p. 344; Trans.

<sup>1</sup> *Op. cit.* p. 29.

<sup>2</sup> Zool. Anz. no. 429 (1893), p. 359. Daudin had already used this term for a South-African *Agama*. I observe that Professor Boettger refers one of Dr. Werner's Algerian Sahara specimens to *A. inermis* (Kat. Rept. Mus. Senck. 1893, p. 49).

<sup>3</sup> Proc. Zool. Soc. 1892, p. 11.

<sup>4</sup> Monatsb. Berl. Ak. 1880, p. 307.



J. Green del. et lith.

AGAMA MUTABILIS.

Figs. 1 & 2 ♂, Gizeh; Fig. 3 ♀, Gizeh; Fig. 4 ♂, Ramleh; Fig. 5 ♀, Fayum.





Zool. Soc. xiii. 1891, p. 117; Boettger, Kat. Rept. Mus. Senck. 1893, p. 49; Werner, Verh. zool.-bot. Ges. Wien, 1894, xliii. p. 78.

*Agama gularis*, Reuss, Mus. Senck. i. 1834, p. 37.

*Eremioplanis aegyptiaca*, Fitz. Syst. Rept. 1843, p. 82.

*Trapelus savignyi* (non Dum. & Bibr.), Gray, Cat. Liz. B. M. 1845, p. 258.

*Agama flavimaculata*, part., Rüpp.<sup>1</sup> Mus. Senck. iii. 1845, p. 302.

*Agama agilis* (non Olivier), Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 28; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 109.

*Agama rudrata* (non Olivier), Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 29; Peters, Mon. Berl. Ak. 1862, p. 271; op. cit. 1880, p. 307; part., Boettger, Ber. Senck. nat. Ges. 1879-80, p. 196.

? *Agama savignyi*, Reich, Sitzb. Ges. nat. Fr. Berl. 1883, p. 149.

*Agama latastii*, Blgr. Cat. Liz. B. M. i. 1885, p. 344.

*Agama aspera* (non Daudin), Werner, Zool. Anz. no. 429, 1893, p. 359; Verh. zool.-bot. Ges. Wien, xlv. 1894, p. 78.

1 ♀. Abukir.

1 ♂ and 1 ♀. Mandara. Dr. Walter Innes.

4 ♂. Ramleh.

2 ♂ and 1 ♀. Maryut district.

1 ♂. Neighbourhood of Cairo.

1 ♂. Abu Roash. Mrs. Anderson.

1 ♂. Gizeh. The late V. Ball, Esq., C.B.

1 juv. Gizeh. The late Miss R. M. Robertson.

4 ♂ and 3 ♀. Gizeh.

1 ♀. The Fayum.

Body moderately elongated, but depressed; head subcordiform; nostril on the canthus rostralis in the hinder part of the nasal, and directed upwards and backwards; ear round, smaller than the eye-opening, with a feeble fringe of pointed scales along its upper border; the tibia and skull (occiput to snout) are nearly equal, sometimes longer and sometimes shorter than one another. Limbs variable; the wrist may reach to any point between the eye and the nostril, and rarely beyond the snout; the tip of the fourth toe may reach to any point between the shoulder and the ear, or may extend as far forwards as the eye; tail depressed, and broad at the base, tapering gradually to a rather fine point and rounded; not unfrequently much longer than the body and head, but much shorter in some than in others. Scales on the upper surface of the head smooth or slightly keeled, more or less convex on the frontal region, and generally keeled on the temporal area; a minute spine or two on the post-temporal region in the finely-scaled forms, but occasionally absent, most marked in those with a coarse lepidosis. Body covered with small, equal, rhomboidal, smooth, indistinctly or distinctly keeled scales, somewhat larger than the ventrals, with a few slightly, if at all, larger

<sup>1</sup> Rüppell, in Neue Wirbelth. p. 14, seemed doubtful whether his *A. flavimaculata* was distinct from the *A. rudrata* (= *A. pallida*) of the Descr. de l'Égypte, but they are two very different species.

scales scattered among them; or the body-scales generally much larger than the ventrals, unequal, strongly keeled and mucronate, and sometimes well marked off from the scales on the sides. Ventrals smooth or indistinctly keeled. Limbs covered with equal, keeled, imbricate scales. Caudal scales keeled.

The males have a rudimentary gular pouch; præanal pores in one or two lines, sometimes present in females.

General colour faint pinkish grey, sandy or greyish brown above, some of the larger scales brighter coloured than the others, especially in the case of specimens with a coarse lepidosis; light brown, quadrangular dorsal spots or cross-bars, arranged as in allied species, may be present or absent; throats of the males in the breeding-season suffused with brilliant blue, with darker longitudinal lines, sometimes white and spotted; the females also have their throats occasionally with faint black lines; under surface of body usually white, but in some the ventral area is covered with blue reticulations, and the sides are rich violet; the præhumeral pit in both sexes deep blue, but frequently there are four short longitudinal brownish nuchal lines, and, in some, cross brownish bars on the top of the head between the eyes. The specimens from the sea-face of the delta are generally greyish speckled with blackish, the enlarged scales being pale-coloured and the tail banded.

*Measurements of an adult male and female.*

♂. Snout to vent 83 mm., tail 115 mm. Ramleh.

♀. " " 78 " " 82 " Fayum.

It lives exclusively on insects. In gravid females I have generally found 9 or 10 eggs.

Is. Geoffroy describes this species as one of the most interesting zoological discoveries made by the French Expedition to Egypt, in the end of the last century. He says it is subject to such sudden and rapid changes of colour that had it been known to the ancients it would have completely thrown the chamæleon into the shade. I kept one of these lizards alive for some time; but, while it was under my observation, the only change of colour it manifested was a slight intensification of the brighter hues on its sides, after it had lain in the sun for some time. There was no real change, but only a brightening up of the colours already present. My observations, however, were made in the winter months, when the lizard was very sluggish.

It is distributed over North Africa from Egypt to Algeria and the Algerian Sahara, and ranges a considerable distance up the Nile valley.

The Arabs apparently do not distinguish between it and *A. pallida* and *A. sinaita*, as they all go under the name of *كادي الجبل* = *kadi el jibál*, or judge of the desert—possibly in allusion to the way in which these lizards are frequently seen with raised heads as if they were surveying their surroundings.

The variations in the length of the skull and in its proportions to the tibia are very considerable.

I have tabulated 41 specimens. In 17 of them the skull is longer than the tibia, in 12 it is shorter, and in the remaining 12 the two are equal. When the lizards from Algeria and Tunisia are separated out from the Egyptian specimens, it is found that 9 out of the 17 Algerian and Tunisian lizards have the skull shorter than the tibia, 4 have it longer, while in 4 these two parts are equal. On the other hand, in the Egyptian lizards, of which there are 24, 3 only have the skull shorter than the tibia, 13 have it longer, while in 8 it is equal. The Egyptian lizards have thus, as a rule, longer skulls than the members of the species in the extreme west of its distribution; but at the same time individuals from exactly the same localities may have their tibiæ longer than the skulls and the reverse. Moreover, a young lizard from Mandara has its skull exceeding the length of its tibia to a greater extent than occurs in any adult; but, on the other hand, a young specimen from Gizeh, only a little older than the foregoing example, has the skull and tibia practically equal.

The following is a synopsis of these measurements:—

	Skull longer than tibia.	Skull shorter than tibia.	Skull and tibia equal.	
Egypt.....	13	3	8	= 24
Algeria and Tunisia .....	4	9	4	= 17

The length of the hind foot of this lizard is also subject to considerable individual variations. A male from the Algerian Sahara, with the head and body 80 millim. long, has a foot 22 millim., whereas another male from the same region, 12 millim. shorter, has its hind foot almost the same length as the former, viz. 21·7 millim. Similar variations occur in Egypt: *e. g.*, a male with its head and body 73 millim. has its foot 25·3 millim. in length, considerably in excess of the foot of a specimen measuring 83 millim., in which it is only 23 millim. The fore limb also presents similar variations, which are brought out in the Table. The tail also varies greatly in its length irrespective of locality and sex; but at the same time the tails of the western lizards tend to be longer than those of the eastern, and more especially longer than the tails of the lizards with the finer lepidosis—*e. g.*, two males, one from Duiat and the other from Egypt, measuring respectively 63 millim. from snout to vent, have tails 115 and 90 millim. long; that is, the eastern tail is 25 millim. shorter than the other, although there is no difference between the length of the bodies of the lizards; and yet I cannot separate them specifically.

In dealing with this North-African species I have taken the opportunity to compare some of the Tunisian and Algerian Sahara specimens and others from the littoral of the Nile delta with undoubted examples of *A. ruderata*, Olivier. I find it impossible

to refer any of the foregoing lizards to *A. ruderata*, which differs from them in its convex snout, greater internasal breadth, and in the nostril being placed decidedly below the canthus rostralis, and thus more or less lateral in position. Its head-shields also are markedly different from those of the North-African lizards, as there are generally one or more ridges to each scale.

Dr. Peters was of the opinion that *A. ruderata* was a form nearly allied to *A. agilis*, Olivier; but he had doubtless before him not the true *A. ruderata*, but *A. mutabilis*, Merrem, because when he expressed this opinion he had only recently identified Messrs. Rohlf's and Stecker's specimen from Cyrenaica as *A. ruderata*. I have not met with a single lizard, either from Egypt or to the west of it, that can be referred to *A. ruderata*. The lizard mentioned under this name by Audouin is *Agama pallida*, Reuss. The forms of *A. mutabilis* with a coarser lepidosis present a certain resemblance to lizards of the *A. agilis* group, and this has doubtless led to their having been occasionally referred to that species.

*Measurements &c. of A. mutabilis, Merr. (in millim.).*

Sex.	Snout to vent.	Tail.	Length of head.	Width of head.	Length of fore limb.	Length of hind limb.	Tibia.	Hind foot.	Pores.	Locality.
♀ ....	93	125	22·3	22·2	45	61	22	23·1	4	Duirat.
♀ ....	87	135	19·6	20·2	44·4	61	23	24·8	..	Tunis.
♀ . . .	86	108	20·8	20	46·3	60	21·5	24·5	..	Duirat.
♀ ....	85	114	18·5	18·5	40·3	55	18	22	..	Tunis.
♂ ....	83	115	20	20·3	39	60	20·5	23	..	Ramleh.
♀ ....	83	109	18·1	18	43·8	61	20	25	7	Duirat.
♂ ....	80	122	19	18·5	41	58	20·2	22	$\frac{8}{12}$	Biskra to Tuggurt.
♂ ....	79	115	20	20	41	56	19	23	7	Ramleh „
♂ ....	79	105	20·5	19	44	59	19·3	23	$\frac{3}{9}$	„ Pl. IX. fig. 4.
♂ ....	78	124	19	19·3	41	57·3	20	24·5	$\frac{11}{12}$	Tibremt.
♀ ....	78	99	19·5	20	40	55	18	21·7	9	Algerian Sahara.
♂ ....	78	99	19·8	19·4	44	58·5	20	24·5	$\frac{4}{11}$ $\frac{11}{10}$ $\frac{4}{4}$	Egypt.
♀ ....	78	82	18·6	20	45	59	18·6	24	..	Fayum. Pl. IX. fig. 5.
♀ ....	77	..	18·6	20	40·5	55	17·6	22·8	..	Maryut district, Alexandria.
♂ ....	76	120	17·5	17·5	40	57·5	20	22·8	10	Tunis.



## Measurements &amp;c. (continued).

Sex.	Snout to vent.	Tail.	Length of head.	Width of head.	Length of fore limb.	Length of hind limb.	Tibia.	Hind foot.	Pores.	Locality.
♂ ....	75	127	18.7	18.5	41.5	58.8	19.7	23.7	$\frac{4}{11}$	Hadjira, Algerian Sahara.
♀ ....	75	80	17	17.5	37.5	50	17	22	..	Egypt.
♂ ....	74	99	17.5	18	40	55	19	22	$\frac{5}{11}$	Mandara, Alexandria.
♂ ....	73	88	19	19	39	60	19	25.3	$\frac{1}{10}$	Desert, Gizeh.
♂ ....	72	98	19	18.6	43.7	57.4	19	23	$\frac{7}{12}$	" " Pl. IX. fig. 2.
♂ ....	71	95	19	18.4	39	56	19	23	$\frac{10}{12}$	Ramleh, Alexandria.
♂ ....	70	90	18	19	39	54	18	23.2	10	Desert, Gizeh. Pl. IX. fig. 1. Compared with type of <i>A. incanis</i> .
♂ ....	69	110	17.5	17	37	51	17.5	21.8	$\frac{7}{4}$	Duirat.
♂ ....	68	106	18	17.1	38	53	18	21.7	$\frac{3}{9}$	Biskra to Tuggurt.
♂ ....	67	99	18	18	37	51	17	21	$\frac{10}{12}$	Maryut district, Alexandria.
♂ ....	67	92	17.5	18	34	46	16	20	$\frac{3}{11}$	" " "
♂ ....	67	89	16.2	15	33	48.8	17	25.5	$\frac{7}{8}$	Algerian Sahara.
♀ ....	64	90	16	16.2	35.5	46.7	16	21	9	Tunis.
♂ ....	63	115	16.6	15.5	37	50.5	18	22	..	Duirat.
♂ ....	63	90	16.5	16.8	35	45	15	17	$\frac{5}{12}$	Egypt.
♀ ....	63	74	16.6	16.4	33.5	45.5	14.5	18.7	$\frac{3}{13}$	Desert, Gizeh. Pl. IX. fig. 3.
♂ ....	61	95	15	14.5	32.2	44.8	15	19.2	..	Biskra to Tuggurt.
♀ ....	60	81	16	15	35	46.5	15	20	$\frac{6}{10}$	Abukir.
♀ ....	60	71	16	16	32	46	15	20	9	Desert, Gizeh.
♂ ....	58	76	15	15.2	33	44.3	14	19	$\frac{3}{8}$	Outskirts of Cairo.
♀ ....	57	72	14.5	15	34.5	46	14.5	19.2	$\frac{5}{5}$	Desert, Gizeh.
♀ ...	54	71	14.5	14.1	30.6	43	14.5	18.2	..	" "
♂ ....	52	69	15	14.2	33	41.5	13.5	18	13	" "
♂ ....	50	80	13.7	13	27.4	38	12.3	16.5	$\frac{6}{11}$	Bou-Saada.
Juv...	47	45	12	13	27.4	41	11.5	16.3	$\frac{11}{6}$	Desert, Gizeh.
♀ ....	41	51	11.5	11	21	28	8.3	16	..	Mandara, Alexandria.

## AGAMA PALLIDA, Reuss. (Fig. 6.)

? *Agama deserti*, Licht. Verz. Doubl. Zool. Mus. Berl. 1823, p. 101.

*Agama rudrata* (non Olivier), Audouin, Descr. de l'Égypte, Hist. Nat. i. (1828?) p. 169; Suppl.

Rept. pl. i. figs. 6. 1 to 6. 3; Hart, Fauna & Flora of Sinai &c. 1891, p. 210.

*Agama pallida*, Reuss, Mus. Senck. Bd. i. 1834, p. 38, Taf. iii. fig. 3; Boulenger, Cat. Lizards

Brit. Mus. 2nd ed. vol. i. 1885, p. 348; Parenti e Picaglia, Rett. ed Anfibi Mar Rosso, 1886,

p. 17; Boettger, Kat. Rept. Mus. Senck. 1893, p. 50; Peracca, Boll. Mus. Zool. Torino,

ix. 1894, no. 166, p. 6; Anderson, Herpet. Arabia & Egypt, 1896, p. 99.

*Agama loricata*, Reuss, l. c. p. 40.

*Agama nigrofasciata*, Reuss, l. c. p. 42.

*Agama leucostygma*, Reuss, l. c. p. 44; *part.*, Boettger, Kat. Rept. Mus. Senck. 1893, p. 49.

*Agama mutabilis*, Rüppell (*part.*), Mus. Senck. Bd. iii. 1845, p. 302; Dum. & Bibr. (*part.*) Erpét.

Gén. t. iv. 1837, p. 505; *part.*, A. Dum. Cat. Rept. Paris Mus. 1851, p. 103; Blanford,

Eastern Persia, vol. ii. Zool. & Geol. 1876, p. 316; *part.*, Lortet, Arch. Mus. Lyon, 1883, iii.

p. 187.

*Trapelus aegyptius*, Duvernoy, Cuv. Règn. An. (1836-46), Reptiles, p. 54, pl. 14. fig. 2.

*Trapelus rudratus* (non Oliv.), Gray, Cat. Liz. B. M. 1845, p. 258.

1 ♀. Tor, Sinaitic Peninsula.

8 ♂ and 5 ♀. East of Suez to Ain Musa.

2 ♂ and 3 ♀. Beltim, between Damietta and Rosetta. Dr. J. G. Rogers.

2 ♂ and 2 ♀. Plain of Kafr Gamus, Matariyeh.

1 ♂ and 1 ♀. Abbasiyeh, near Cairo. Brigadier-General H. M. L. Rundle, C.M.G., D.S.O.

2 ♂ and 3 ♀. Neighbourhood of Cairo.

2 ♂ and 1 ♀. Neighbourhood of Cairo. Dr. Walter Innes.

1 ♂ and 1 ♀. Mokattam Hills. Dr. Walter Innes.

2 ♂. Kafr Amar, below Wasta.

2 ♂ and 2 ♀. Tel el Amarna. Professor W. M. Flinders Petrie, D.C.L.

2 ♂ and 2 ♀. Tel el Amarna.

1 ♀. Lower Egypt. A. R. Birdwood, Esq.

Body rather short and depressed; head convex and cordate, its temporal breadth about equalling its length; the nostril on the canthus rostralis in the hinder part of the nasal; ear smaller than the eye-opening, with a feeble fringe of two or more pointed scales along its upper border. Tibia variable, generally shorter than the skull, rarely equal to it, and exceptionally longer than the skull. The fore limb, when laid forwards, has the wrist generally reaching the snout, occasionally in advance of it, sometimes only reaching the nostril, and more rarely to between the eye and the nostril; the tip of the fourth toe, when the hind limb is extended forwards, usually reaches the ear, or midway between the ear and the eye, and in a few cases even to the eye, and is rarely so short as only to reach the shoulder. Tail depressed at the base

and broad, rapidly contracting and nearly round, longer than the body and head, shorter in some than in others. Upper surface of the head covered with moderately large polygonal scales, flat and nearly smooth, sometimes slightly rugose; some enlarged scales occasionally with feeble keels on the temporal and on the supratemporal regions; usually two spines on the post-aural region. Body covered with flat, irregular, slightly imbricate or juxtaposed, smooth or keeled, small scales, with larger keeled scales scattered among them, and generally more or less mucronate; the scales decrease in size towards the sides, where they equal the size of the ventrals. Ventrals smooth and not much smaller than the largest of the ordinary scales on the middle of the back. Upper surface of the limbs covered with smooth, or more or less keeled, imbricate scales, with enlarged keeled scales among them. Caudal scales nearly smooth or feebly keeled; generally enlarged keeled scales present on the base of the tail.

No gular pouch. Males with præanal pores arranged in from 2 to 4 series, sometimes as many as 36 pores, and rarely present, in a single line, in females.

The general colour of this species varies considerably, as it is occasionally deep bluish grey, pale yellowish, or pale brownish. The body is occasionally marked by

Fig. 6.



*Agama pallida*, Reuss.

transverse dark-coloured bars—one between the eyes superiorly, one across the neck, one on the shoulder, another across the middle of the body, a fifth across the loins, and about 14 similar bars on the tail; a large white spot generally occurs in the mesial line of each dorsal bar; the bar between the eyes, the central bar of the back, and also the shoulder-bar are frequently absent, and likewise the white spots; the upper surface of the limbs is also more or less barred with dark brown or nearly black.

*Measurements of an adult male and female.*

♂.	Snout to vent	75 mm.,	tail	89 mm.
♀.	„ „	81 „ „	„ „	89 „

This lizard is very common in the desert, either on its margin or on the extensive

plains that slope down to the Nile and on which the lines of drainage are marked by the presence of tufts of a stunted vegetation. It is also found penetrating into the desert along the deep waterworn wádís, which also support a variety of plants. The vegetation attracts the insects on which the lizards subsist. It is prevalent also in the semi-desert tracts at the mouth of the delta, and is found not far from the sea in suitable localities.

It is remarkably active, and when pursued runs with great rapidity, seeking for shelter under stones and among the tufts of vegetation.

There are generally five eggs in each gravid oviduct.

It occurs in various parts of the Sinaitic Peninsula, and Count Peracca has recorded it from Northern Syria (Damascus) associated with *Agama rudrata*, Oliv. It is found on both sides of the Nile valley, but none of my specimens come further from the south than the plain of Tel el Amarna.

I have examined the types of *A. pallida*, *A. leucostigma*, *A. nigrofasciata*, and *A. loricata*, and I cannot detect that they are in any way specifically distinct. The type of *A. loricata*, Reuss, was from Upper Egypt. It has been identified by some herpetologists with *A. rudrata*, Oliv., but, as already said, no lizard with the characters of the latter species has ever been found in Egypt, so far as I am aware.

The head of this species is broad and high between the eyes, the muzzle is short, and thus in its general characters the head is very similar to that of *A. mutabilis*. The nostril is situated on the canthus rostralis, and is thus more internal than the nostril of *A. rudrata*. I have failed to detect any essential difference between the nostrils of this species and that of *A. mutabilis*. I make this statement because I attempted to separate out the two forms by their nostrils irrespective of other characters and failed to do so, as they all fell under the one category of the "nostril on the canthus rostralis."

The head-scales are smooth in the sense that they are not prominently rugose as in *A. rudrata*; but, in the specimens enumerated, they present more or less rugosity, and an illustration of this is found in the female from the Mokattam Hills and another from Tel el Amarna. In the former some of the head-scales are ridged and others covered sparsely with little tubercular eminences, while in the latter specimen they are irregularly covered with ridges. A similar condition is also present on the head-scales of a male from the plain of Kafr Gamus, where this lizard is not at all uncommon. On the area between the eye and the ear there is an enlarged group of scales, some of the scales being larger than the others and more or less ridged and keeled. Along the upper margin of the ear-orifice there are generally three downwardly pointed scales, and on the back of the head and on the nape some scattered spinose scales, but not always present and of no great prominence. The depressed body is covered uniformly with small scales of nearly equal size, rather feebly imbricate and tending to juxtaposition, a character which separates this species from *A. mutabilis*.

The uniformity or nearly so of these small scales that form the groundwork, so to speak, of the lepidosis is one of the features by which *A. pallida* can be distinguished from *A. mutabilis*, in which the scales of the general lepidosis are much more irregular in size. These small scales are generally devoid of keels, but they are occasionally keeled here and there. Variations in the lepidosis are sometimes observable in which it is not so uniform, but uniformity prevails compared to the diversity present in *A. mutabilis*. Scattered in a varying degree among this groundwork of small scales occur keeled enlarged scales, some larger than others. On the upper surface of the fore and hind limbs the scales are carinate and imbricate, with an intermixture of enlarged scales. The ventrals are smooth, pointed or divided at their tips, and are about the same size as the scales of the sides of the body.

The tail is covered above with keeled pointed scales, slightly larger than the largest of the ordinary scales on the middle of the back. The limbs are well developed and the fingers and toes are only moderately long, and the claws of the fore feet are well developed and larger than in the hind foot.

Notwithstanding the differences I have attempted to indicate as existing between *A. pallida* and *A. mutabilis*, they are so closely allied that I am not confident they may not ultimately be united by the study of larger materials.

I subjoin a table (p. 104) giving the details of measurements &c. of the specimens that have come under my observation.

Out of the 44 specimens enumerated, 33 have the skull longer than the tibia; but in 17 of them the excess in each case is less than a millim., and in 13 less than 2 millim., and only in two more than 2 millim. Six of the 44 have the tibia and skull equal, while in five the tibia is longer than the skull, but only to the extent of 1 millim. or so.

A single line of præanal pores is rare, and when the number of lines exceeds two the transverse arrangement of the pores is not very regular, and they may not be continuous from side to side.

There are variations in the colour that explain the origin of the terms *leucostigma* and *nigrofasciata* applied by Reuss to examples of this species from Upper Egypt and Nubia. For example, in a specimen from the east of Suez there is a dark bar on the upper surface of the head, between the eyes, one across the occipital region, another on the neck, a fourth on the body behind the shoulders, a fifth across the middle of the back, a sixth on the loins, and 14 black bars on the tail. A white spot occurs in the centres of the three essentially dorsal bands. When these spots are not very prominent we have *nigrofasciata*, and when they are very distinct *leucostigma*.

In 1823, Lichtenstein<sup>1</sup> gave a short diagnosis of an *Agama* from Egypt, which he called *A. deserti*; but his description is so imperfect that it is impossible to reconcile it

<sup>1</sup> Verz. Doubl. Ber. Mus. 1823, p. 101.



*Measurements &c. of A. pallida, Reuss (in millim.).*

Sex.	Snout to vent.	Tail.	Length of head.	Width of head.	Length of fore limb from head of humerus.	Length of hind limb posteriorly.	Tibia.	Length of hind foot.	Pores.	Locality.
♀ ....	81	87	20	19	41.5	48.5	18	20	..	Tel el Amarna.
♀ ....	81	89	19.3	19	42.5	58	18.5	21	..	Beltim.
♂ ....	75	89	17	18.8	37	51	17	20.5	$\frac{7}{11}$	Mokattam Hills, Cairo.
♀ ....	72	77	18	19	40	51	16.5	20	9	Tor, Sinaitic Peninsula.
♂ ....	71	93	17.5	19	36	48	16.6	19	$\frac{10}{14}$	Kafr Amar, below Wasta.
♀ ....	71	80	17.5	18	38.5	50	17	20	$\frac{12}{12}$	Mokattam Hills, Cairo.
♂ ....	71	96	18	18.5	39	52	17.4	19.2	..	Suburbs of Cairo.
♂ ....	71	91	18.8	18.8	36.4	49	16	20.4	$\frac{2}{11}$	Beltim, between Rosetta and Damietta.
♂ ....	69	92	17.5	18	36	49	16.5	17.6	$\frac{8}{12}$	Suburbs of Cairo.
♀ ....	69	85	17.4	18	41	50	17.2	20.8	$\frac{13}{12}$	Ain Musa, near Suez.
♀ ....	69	86	18	18	40	54	17	19.8	..	Tel el Amarna.
♀ ....	69	77	18	18	39	51	17.5	19.8	..	Ain Musa, near Suez.
♂ ....	69	93	18	18.6	37	48.5	17	20	$\frac{6}{13}$	Beltim, between Rosetta and Damietta.
♂ ....	69	91	17	18.5	37.5	52	17	20.4	$\frac{13}{13}$	Plain of Kafr Gamus, He- liopolis.
♂ ....	68	83	17	17.3	38	52	17	20.2	$\frac{3}{16}$	East of Suez Canal, Suez.
♀ ....	68	74	17.4	17.3	38	48.3	16	19.5	$\frac{15}{16}$	Suburbs of Cairo.
♂ ....	68	81	16.5	17	36	46	16	20	..	" "
♂ ....	67	97	16	16.5	36.3	50	15.5	20	$\frac{12}{14}$	East of Suez Canal, Suez.
♂ ....	66	98	17	18.5	37	52	17	19.8	$\frac{5}{11}$	Plain of Kafr Gamus, He- liopolis.
♂ ....	66	83	16	17	35	50	17	20	$\frac{12}{13}$	Ain Musa, near Suez.
♀ ....	66	75	16	16.6	37	49	15.5	19.9	..	East of Suez Canal, Suez.
♂ ....	65	89	15.7	17	36.5	50.5	15.9	19	$\frac{12}{12}$	" " " "

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Length of head.	Width of head.	Length of fore limb from head of humerus	Length of hind limb posteriorly.	Tibia.	Length of hind foot.	Pores.	Locality.
♀ ....	65	61	16	17	34.3	45	14.8	18	..	Abbasiyeh, Cairo.
♂ ....	65	81	16	16.8	34	47	15.4	19	$\frac{11}{10}$	Ain Musa, near Suez.
♂ ....	65	88	16.5	17	33.8	46	15.5	19	$\frac{8}{14}$ $\frac{14}{14}$	Kafr Amar, below Wasta.
♂ ....	65	74	16	17.4	36	48.5	16	19	$\frac{12}{12}$	East of Suez Canal, Suez.
♀ ....	65	72	15	16	32	43	14.4	18.5	..	Tel el Amarna.
♀ ....	64	69	15.3	16	34	43.7	14.8	17.5	..	" "
♀ ....	62	74	15	16	34	43	14	17.5	..	Suburbs of Cairo.
♀ ....	62	71	15	16	34	44	14.5	17	..	Beltim, between Rosetta and Damietta.
♀ ....	61	71	15.7	15.8	34	44	14.8	18	..	Plain of Kafr Gamus, He- liopolis.
♂ ....	60	72	15	16.5	35	48.3	16	18	..	East of Suez Canal, Suez.
♀ ....	60	68	15.6	16.5	35.7	45.5	15	18.5	..	Plain of Kafr Gamus, He- liopolis.
♂ ....	60	75	15.3	16	34	45.5	14	18.5	$\frac{12}{12}$	Tel el Amarna.
♀ ....	59	62	15.3	16.3	33.8	44	14.2	17	..	Beltim, between Rosetta and Damietta.
♂ ....	58	78	15	15.5	33.5	46	15	18	$\frac{14}{14}$	Tel el Amarna.
♂ ....	58	68	14.2	15.8	34	47	15	19.2	$\frac{3}{13}$ $\frac{13}{12}$	Ain Musa, near Suez.
♀ ....	58	75	14.8	16	34.5	46.5	15	18.1	..	East of Suez Canal, Suez.
♀ ....	58	78	15.4	16	35	44	15	18.5	..	Suburbs of Cairo.
♂ ....	58	80	15.8	16	32	46	14.6	17.2	$\frac{13}{13}$	Abbasiyeh, Cairo.
♀ ....	55	58	15	15.2	32.8	42.5	14	15.4	..	Tel el Amarna.
♀ ....	47	69	12.8	13	28.5	37.4	12.3	15.2	..	East of Suez Canal, Suez.
♂ ....	42	55	12	12.7	24	35	11.5	13.5	$\frac{3}{14}$ $\frac{14}{15}$	Tel el Amarna.
♂ ....	36	41	10	11	21.3	29.2	9	12	$\frac{11}{11}$	" "

with any known species of the genus. As the type is probably still in Berlin, the zoologists of that Institution may possibly be able to say what it is. A specimen

presented by the Berlin Museum to that of Paris appears in A. Duméril's Catalogue<sup>1</sup> under *A. mutabilis* along with Olivier's types of *A. rudrata*.

Mr. Boulenger has described from Somaliland, under the name of *A. robecchii*<sup>2</sup>, a very handsome lizard allied to this species, but distinguished from it by "the very slight difference in length between the third and fourth toes, the larger ear-opening, and the absence of a fringe above it, and the more strongly keeled dorsal scales." The lizard recorded by Professor Vaillant<sup>3</sup> from the same region under the name of *A. rudrata* may possibly prove to be *A. robecchii*.

AGAMA SINAITA, Heyden. (Plate X. fig. 1.)

*Agama sinaita*, Heyden, Rüpp. Atlas nördl. Afr. 1827, p. 10, pl. iii.; Dum. & Bibr. iv. 1837, p. 509; A. Duméril, Cat. Rept. Mus. Paris, 1881, p. 103; Peters, Mon. Berl. Ak. 1862, p. 271; Boettger, Ber. Senck. nat. Ges. 1879-80, p. 195; Kat. Rept. Mus. Senck. 1893, p. 49; Blgr. Cat. Liz. B. M. i. 1885, p. 339; Ann. & Mag. N. H. (5) xx. 1887, p. 407; Werner, Verh. zool.-bot. Ges. Wien, xliii. 1894, p. 359; Anderson, Herp. Arabia & Egypt, 1896, pp. 27, 99.

*Agama arenaria*, Heyden, Rüpp. Atlas nördl. Afr. 1827, p. 12.

*Podorrhoa (Pseudotrapelus) sinaita*, Fitz. Syst. Rept. 1843, p. 81.

*Trapelus sinaitus*, Gray, Cat. Liz. B. M. 1845, p. 259; Günther, Proc. Zool. Soc. 1864, p. 489.

*Trapelus sinaiticus*, Tristram, West. Palest. 1884, p. 154, pl. xvi. fig. 3.

*Agama sinaitica*, Rüpp. Mus. Senck. iii. 1845, p. 302; Bedr. Bull. Soc. Moscou, 1879, no. 3, p. 37.

*Agama mutabilis*, Blgr. (*non* Merrem) Cat. Liz. B. M. i. 1885, p. 338; Boettger (*non* Merr.), Kat. Rept. Mus. Senck. 1893, p. 48.

*Agama sinaiticus*, Hart, Fauna & Flora of Sinai &c. 1891, p. 210.

1 ♀. Plain of Suez.

1 ♂, 1 ♀, 1 juv. Stony desert above Wádí Hoaf.

1 ♀. Guarda, Dongola. Surgeon-Captain R. H. Penton, D.S.O.

Body rounded, moderately depressed. Head cordate, much shorter than the tibia and more rounded in the male than in the female; the occipito-parietal and supra-orbital regions full and prominent; snout short; nostril slightly above or on the line of the canthus rostralis and directed backwards and upwards, in the hinder part of a rather large and swollen nasal shield; ear larger than the eye-opening; skin of the neck and throat in loose folds. Limbs long and slender, the fore limb when laid forwards has the wrist in advance of the snout; the hind limb when stretched forwards has the tip of the fourth toe as far forward as the snout, or it may only reach to the eye; the tibia is longer than the distance between the occiput (skull) and

<sup>1</sup> Cat. Rept. 1851, p. 103.

<sup>2</sup> Ann. Mus. Civ. Genova, ser. 2, xii. (xxxii.) 1891, p. 6, pl. i. fig. 1.

<sup>3</sup> Révoil, Faune et Flore Pays Conalis, 1882, Rept. et Batr. p. 8.



J. Green del. et lith.

AGAMA SINAITA. Fig. 1 ♀, Plain of Suez.

AGAMA SPINOSA. Fig. 2 ♂, & Fig. 3 ♀, Suakin.





the snout; digits moderately long, the third digit the longest. Tail about twice as long as the head and body, rather broad at the base and depressed, the remainder laterally compressed. Scales on the head large, most so on the supraorbital area, where they are flat and tessellate or slightly imbricate in arrangement, but more or less obscurely, excentrically acuminate or ridged on the upper surface of the snout, where they are more irregular in form and size; on the occipito-parietal region they are also occasionally more or less feebly pointed; a series of large scales in an antero-posterior oblique line midway between the ear and the posterior angle of the orbit; an enlarged triangular scale near the lower end of the anterior border of the ear, variously developed; no spines on the head or neck. Body covered with equal more or less imbricate keeled or nearly smooth scales, very regular in their arrangement, and with no enlarged scales scattered among them, but with the mesial dorsal lines of scales larger than the ventrals and rapidly diminishing in size towards the sides, where the scales are smaller than the ventrals. Ventrals smooth or feebly keeled here and there. Limbs covered with keeled imbricate scales, those on the under surface small and smooth: under surface of the digits covered with small brown spines. The scales on the tail strongly carinated, and three times as large as the largest dorsal scales, more or less imbricate, but not arranged in verticils.

No gular pouch. Males with 4 to 8 præanal pores, more or less present in adult females.

Colour: head yellowish, sometimes suffused with blue above, and in adult males its under surface from the chin to the chest rich blue; the same area in females yellow, or yellow marbled with dark bluish-grey lines. Upper surface and limbs may either be a pale reddish yellow or a dusky bluish yellow; a broad reddish-brown band across the neck ending in an intensely blue area before the shoulder; a large deep rusty red spot on either side behind the shoulder, separated from each other in the mesial line, and a similar but smaller spot on each side of the loins before the hind limbs; sides of the body occasionally dusky greyish with obscure pale spots; the base of the tail with a number of similarly coloured bars; general colour of under surface yellowish white.

I first met with this lizard on the grey stony desert plateau immediately above the Wádí Hoaf. It was resting at midday by the side of the footpath, with its blue head erect, but, as I approached it, it disappeared with remarkable rapidity under some stones and was lost; but a few days afterwards I went back to the spot and captured three specimens. I never observed it again near Heluan, but I obtained one on the stony desert between Suez and the Ataka mountains.

Its food appears to consist largely of ants, and in capturing them it swallows a considerable quantity of sand.

The large female from Guarda was gravid, five eggs being in the left and four in the right oviduct; and as each egg measured about 15 millim. in length, the abdomen was enormously distended. The rectum, full of the debris of ants mixed with fine sand,

was quite as large as an egg and lay to the right of the mesial line, *i. e.* on the side in which there was most room.

This species, which has only been recorded from the right bank of the Nile, ranges northwards from Sennaar across the Isthmus of Suez to Southern Syria, the Sinaitic Peninsula, Arabia, Medina, Aden, Hadramut, Maskat, and Persia (*A. Duméril*)<sup>1</sup>.

*Measurements &c. of A. sinaita, Heyden (in millim.).*

Sex.	Snout to vent.	Tail.	Length of head.	Width of head.	Length of fore limb from head of humerus.	Length of hind limb from behind.	Length of tibia.	Præanal pores.	Locality.
♀ . . . .	90	162	23	21	53	70	26	..	Guarda, Dongola.
♀ . . . .	76	124	21	18.5	49	68	26	4	Plain of Suez.
♀ . . . .	65	140	18.5	17	44	65	24	4	Desert above Wādī Hoaf, Heluan.
♂ . . . .	62	147	17	17	41	65	24	4	" " " "
juv. . .	43	83	12	11.5	29	41	14.8	4	" " " "

I have examined the types of *A. sinaita*, Heyden, and *A. arenaria*, Heyden, preserved in the Frankfort Museum. The type of the former is a male with no gular pouch, and with six large præanal pores, *i. e.* with the same number as occurs in the specimens in the British Museum referred to *A. arenaria*. The dorsal scales are small and imbricate, but feebly so, of very uniform size, but very regularly decreasing in dimensions towards the sides, where they are very small, yet still feebly imbricate. They are quite smooth on the anterior part of the body, but the scales on the limbs and sacral region appear to have been keeled, but only feebly so. The features of this individual are the small size of the dorsal scales, the regularity of their arrangement, their little imbrication, and their generally hexagonal form. The scales on the ventral surface are almost as large as the central line of scales on the back, and are smooth, or feebly keeled here and there. The scales on the outer sides of the limbs are considerably larger than any of those on the body, are strongly imbricate, and markedly keeled. The limbs are long and slender, and the third digit of both limbs is the longest. The scales on the top of the head are large, juxtaposed, and smooth, and there is a spine at the anterior margin of the ear. The nostril is placed slightly above the canthus rostralis, and looks upwards and backwards. The naked ear is larger than the eye-opening. The tail is laterally compressed, and the scales are strongly keeled. The coloration is completely faded.

The foregoing specimen was from Arabia Petræa.

<sup>1</sup> Specimens examined.

*A. arenaria*, Heyden, is represented in the Frankfort Museum by the two types from Upper Egypt, presented by Rüppell. They do not appear to me to differ from *A. sinaita*, except in having their dorsal scales a little more strongly keeled. In both there are seven præanal pores.

The females from the Hadramut have distinct præanal pores, also those from Suez and Heluan.

The specimens of this species from Lower Egypt also illustrate its variations. I have met with it, as I have said, only on the Plain of Suez and in the desert (Wádí Hoaf) at Heluan. The lizard from the former locality has its dorsal scales practically smooth, whereas those from the latter have distinctly keeled scales. The specimens in the British Museum referred to *A. arenaria*, Heyden, and also from Egypt, exactly resemble the lizard from the Plain of Suez; whereas two specimens in the British Museum from Mount Sinai, and referred to *A. sinaita*, Heyden, correspond to one of my Heluan lizards, a young individual.

The adult female from Heluan (Wádí Hoaf) has the mesial line of dorsal scales very slightly, if at all, enlarged, considering the fact that in all specimens belonging to one or other of these varieties the scales gradually diminish in size towards the sides. In this specimen, however, the scales are decidedly imbricate and distinctly keeled. On the other hand, in the specimen from the Plain of Suez the scales are only feebly imbricate, and carination is all but completely lost. The mesial dorsal scales hold almost the same proportions to the lateral scales as in the Wádí Hoaf female. In both of these specimens, and in the Hadramut examples as well, the ventrals do not vary in size. As a rule, the Hadramut specimens have the mesial dorsal scales decidedly larger than the ventrals, and all have distinctly keeled scales, but, among some of them, the difference in size between dorsals, laterals, and ventrals graduates in the same way as in the Wádí Hoaf female.

In view of these facts, and the exact similarity of these lizards in the other details of their external structure, the differences I have pointed out can only be regarded as illustrative of variation, but they present no stability to entitle them to varietal rank. It is only another example of the remarkable modifications to which the scales of many species of the genus *Agama* are subject.

## AGAMA FLAVIMACULATA, Rüppell. (Plate XI.)

*Trapelus flavimaculatus*, Rüppell, Neue Wirbelth. Rept. 1835, p. 12, pl. vi. fig. 1; *part.*, Mus. Senck. iii. 1845, p. 302.

? *Agama agilis* (non Olivier), Aud. Descr. de l'Égypte, Nat. Hist. i. ? 1829, p. 169, Suppl. pl. i. fig. 5. *Agama leucostigma*, Blgr. (non Reuss), Cat. Liz. B. M. i. 1885, p. 346; *part.*, Boettger, Kat. Rept.

Mus. Senck. 1893, p. 49.

? *Agama agilis*, Gasco, Viagg. in Egitto, pt. ii. 1876, p. 106.

*Agama flavimaculata*, Anderson, Herpet. Arabia & Egypt, 1896, p. 59.

*Agama savignyi*, Anderson, Herpet. Arabia & Egypt, 1896, p. 100.

13 ♂ and 4 ♀. Between Ismailia and Suez. Middlemass Bey, Inspector-General Coastguard Service, Egypt.

1 ♂. Beltim. Dr. J. G. Rogers.

1 ♀. Kafr Amar, below Wasta, on Assiut Railway.

Body moderately elongate, not depressed; head broadly cordate in adults, less so in the adolescent, longer in some than in others; canthus rostralis not defined anterior to the nasal shield, which is circular, non-tubular, with the nostril directed backwards, outwards, and upwards in the hinder part of the shield internal to or on the canthus rostralis; ear considerably smaller than the eye-opening, with a fringe of from 2 to 4 pointed scales along its upper border. Limbs well developed, covered with regular, keeled, imbricate scales of moderate size. The wrist reaches to the anterior border of the eye or to the nostril, and the tip of the fourth toe to the ear or nearly so. Third finger slightly shorter than the fourth, the fifth does not extend so far forwards as the second; the fourth toe considerably longer than the third, the fifth does not extend so far as the first. Tibia shorter than the skull, occasionally nearly equal to it. Tail longer or as long as the body and head, rounded, non-verticillate, rather thick at the base, especially in adult males, covered with regular keeled scales. Upper surface of the head covered with more or less convex scales, largest on the mesial line; a number of large, more or less obtusely keeled scales behind the eye, with some generally strongly keeled spiny scales on the temporal region. Body covered above with moderately sized, unequal, rarely nearly equal, imbricate, more or less acuminate or feebly mucronate keeled scales, those on the sides about half the size of the dorsal scales and more or less obtusely keeled; 77 to 95 round the middle of the body. Ventral scales keeled.

A well-developed gular pouch in both sexes, largest in the males. No præanal pores are present, but rarely some males show very faint indications of the tendency to form feebly callose scales.

In adult Arabian specimens, in alcohol, the head is pale yellowish tinged with blue on the snout and on the occiput and temporal region, and with olive-brown in some; body olive or greyish brown, the sides of the neck, the shoulder, and upper part of the fore-limb and sides of the body, and sometimes the mesial line of the back,





AGAMA FLAVIMACULATA.

Fig. 1 ♂, Shaluf, Suez; Fig. 2 ♀, Suez District; Fig. 3 ♀, Kafr Amar.





suffused with deep purple; the throat from the chin backwards to the chest deep purple, generally in lines converging to the pouch, which is uniformly purplish brown in an adult female. Many of the scales of the body, head and limbs entirely yellow, giving a spotted appearance to the lizard; the spots in some arranged more or less in transverse lines across the sides, and on the upper surface of the limbs in transverse bars. Under surface yellowish, with occasional purple spots or reticulations; tail pale but bright yellow, obscurely banded with pale brownish, or the bands absent.

In specimens from Egypt, in alcohol, the general colour is olive-grey or sandy yellowish, sometimes with traces of black on the head, back, and sides of the body, but more frequently absent; occasionally many of the scales are pale yellow, but this does not occur to the same extent as in Arabian specimens. Underparts yellowish. Tail uniform with the body. In the young there is a narrow pale olive-brown band across the head between the eyes anteriorly, another behind the eye towards the ear, another from the upper angle of the orbit backwards to the shoulder; two posteriorly divergent bands arise on the occiput and pass backwards to the shoulder, but behind this point each line is continued interruptedly along the body to the base of the tail in the form of 5 short bars, each of which gives off a process passing obliquely upwards and forwards to the mesial line of the back, to join a corresponding one from the opposite side, while from the posterior end of each bar another process passes obliquely backwards and upwards to join its fellow of the opposite side; by this arrangement five pale triangular areas are defined along the mesial line of the back, the centre of each being traversed longitudinally by a pale brown spot; the band from behind the eye is continued behind the shoulder along the sides of the body in an almost similar manner. In the great majority of the specimens all traces of these bands are lost, but in two females (Pl. XI. figs. 2 & 3) the longitudinal interrupted continuations of the cervical bands remain persistent as light brick-red spots. The figure of *A. savignyi*, Dum. & Bibr. (Descr. de l'Égypte), shows a similar arrangement of spots, and in the type of the species the white spots of the mesial line of the back remain, while the bars defining them are obsolete.

None of the specimens from Egypt attain to the dimensions of the lizards from Medina, and it may be that they constitute a local race distinguished solely by the smaller size of the individuals composing it, and leading into *A. tournevillei*, Lataste.

*Measurements of a male and female.*

♂. Snout to vent 95 mm., tail 123 mm.

♀.   "       "   83   "   "   120   "

With three exceptions all my specimens of this species were obtained in the tract of country lying between Suez and Ismailia. One specimen was captured between Rosetta and Damietta, and two at Kafr Amar, a village above Cairo, and near to

Wasta on the railway to Assiut. I have never seen it alive myself, doubtless owing to the fact that I have never been in Egypt during the months when reptilian life is in evidence everywhere.

The native name of this lizard is قَانِي الْجَبَلِ اَزْرَق = *kadi el jibál azrak*, or blue kadi of the desert.

I have not met with in Egypt any lizard belonging to the group of which *A. agilis* may be taken as the type.

In the Supplementary Plates illustrating the account of the Reptiles in the 'Descr. de l'Égypte,' an agamoid lizard is represented on Pl. i. fig. 5. Audouin held that it did not differ from *A. agilis*, Olivier; but Duméril and Bibron, on the other hand, considered it to be a distinct species, which they named *A. savignyi*.

In 1862, Peters received a lizard from Dongola which he referred to *A. savignyi*; but, in 1869, he altered his opinion regarding it and described it as a new species, *A. hartmanni*. In this last communication he stated that *A. savignyi* was identical with *A. flavimaculata*, Rüppell, and that it was quite distinct from what he styled the nearly allied *A. agilis*, Olivier, to which Duméril and Bibron have assigned *A. flavimaculata*, Rüppell, as a synonym.

I recently came into possession of five males and three females of *A. flavimaculata*, Rüppell: one of them, an adult female, so closely resembles the type which I have studied in the Frankfort Museum, also a female, that it may be regarded as typical. The remaining specimens are specifically identical with this female. All of them were obtained at Medina, Arabia, whereas the type was described from a specimen captured at Jiddah.

I am indebted to Middlemass Bey, Inspector-General of the Coastguard of Egypt, for having put me in the way of obtaining the foregoing seventeen lizards which I refer to this species, and to Dr. Rogers for a single specimen from the lower part of the delta. The specimen from Kafr Amar, a female (Pl. XI. fig. 3), differs considerably from the adult female from Medina in the more equal character of its scales and by their little carination, but the seeming gap between the two is filled up by other individuals differing still less from the typical form. The variation, although considerable, is much less than occurs in *A. mutabilis*. This Kafr Amar female may possibly be the same form as the lizard figured by Savigny and named by Duméril and Bibron *A. savignyi*, and represented with regular and equal scales.

They are distinguished from *A. agilis*, the types of which I have examined on two occasions, thanks to the courtesy of Prof. Vaillant and M. Mocquard, by the more unequal and irregular character of their scales, in the more strongly keeled ventrals, in the presence of a large gular pouch in both sexes, in the absence of true præanal pores, and by their coloration.

Audouin described the colours of the lizard figured by Savigny evidently from a coloured drawing made probably from life, as the colours he describes disappear, as a

rule, when agamoid lizards have been placed in alcohol. The general colour, according to Audouin, was represented as a greenish yellow passing into olive; there were longitudinal series of well pronounced brown spots along the back, and similarly coloured transverse bands on the tail. The upper surface of the head and the pouch were of a beautiful brilliant blue. In connection with this account of the colours, it is noteworthy that the lizards from Lower Egypt here referred to *A. flavimaculata* are called by the natives "the blue judge of the desert": as I have never seen it alive, I cannot say to what extent blue prevails.

This species has been regarded by some herpetologists as identical with *A. leucostigma*, Reuss. Through the kind permission of Professor Boettger I have examined the two types of the latter, both of which were from Upper Egypt. In them the nostril is situated on the canthus rostralis; the head is short and broad, the ear is smaller than the eye and has a fringe of 2 or 3 small pointed scales along its upper border. The body is depressed and covered with small, more or less imbricate, smooth or indistinctly keeled scales, with much larger scales scattered among them, each scale being more or less keeled and sometimes pointed. Limbs covered with imbricate keeled scales, some of which are larger than the others. Limbs moderately developed; the fore limb when laid forwards has the wrist nearly between the nostril and the eye, while the hind limb (fourth toe) reaches the ear. The third finger is shorter than the fourth, and the fifth than the second; the third toe is shorter than the fourth, and the fifth does not extend as far as the first. Tail rounded, covered with keeled scales, with larger ones intermixed on the base. Ventral scales small, smooth. No gular pouch. Its depressed body, the marked difference between the small and large scales, the smooth ventrals, and the absence of a gular pouch are all features of *A. pallida*, with which it appears, as I have already said, to be identical.

In the description I have given of the lepidosis of *A. flavimaculata* I have described the scales as unequal or rarely nearly equal. An illustration of the latter is the female from Kafr Amar, figured on Pl. XI. fig. 3, which recalls the figure of *A. savignyi*; but there is a young specimen from the area between Suez and Ismailia in which the scales have the same character. This specimen presents the peculiar banded coloration with enclosed triangular pale dorsal areas. Another specimen from the same locality, with similar coloration, has the scales distinctly unequal, and in this respect it leads into other and larger specimens, in which the scales are still more unequal and in which the coloration is uniform. In the first and smallest of these specimens the scales are convex and obtusely keeled, in the second the convexity is less marked, while in the third the scales are still more flattened, the keels sharp, terminating in a fine point and tending to become mucronate. These equal or nearly equal scaled lizards are the forms which lead into *A. tournevillei*.

One specimen considerably larger than any of those already considered, viz. a male, measuring 92 millim. from snout to vent, with a proportionally longer head

than all the others, is still more pronouncedly like *A. tournevillei*, even although its scales are unequal and more or less mucronate, as its head is long and pointed, with the snout very gradually sloping, the lower jaw being decidedly underhung. It has also the markings of *A. tournevillei*. All the other specimens, however, have short, broad and cordate heads like *A. flavimaculata*, but in them also similar markings to those of *A. tournevillei* are present. Unfortunately there is only one example of the latter species in the British Museum, and I cannot with it only as my guide refer *A. tournevillei* to *A. flavimaculata*. In an adult male of the latter from Medina, longitudinal brown bands occur as in those of the young specimen I have described, and exactly resembling those of *A. tournevillei*, and moreover their continuation on to the sides of the body can be detected although much obscured by their increased breadth and the presence of pale yellow spotted scales. On the mesial line of the back also, as in the type of the species, there are five or six white spots, the remains, as it were, of the pale dorsal areas of the young. My impression is that with further materials it will be possible to lead directly from typical *A. flavimaculata* into *A. tournevillei* through these eastern Egyptian lizards, the proportions of whose digits, as in typical *A. flavimaculata*, are the same as in *A. tournevillei*. The latter will thus probably prove to be the Western Saharian modification of the Arabian lizard. *A. tournevillei* is provided with a single row of præanal pores; but while no pores have been present in any of the typical examples of *A. flavimaculata* examined by me, these Eastern Egyptian males, as has been mentioned, show a tendency, extremely feeble it is true, but still present in one or two, to the formation of callose scales.

*A. flavimaculata* is closely allied to *A. jayakari*, but the latter is distinguished from the former by its large, regular, strongly keeled and mucronate scales, and by its less cordate head, which is considerably shorter than the tibia.

#### AGAMA SPINOSA, Gray. (Plate X. figs. 2 & 3.)

*Agama spinosa*, Gray, Griffith's An. King. ix. 1831, Synop. p. 57, plate; Blgr. Cat. Liz. B. M. i. 1885, p. 355; Ann. Mus. Civ. Genova, ser. 2, xvi. (xxxvi). 1896, p. 550; Parente e Picaglia, Rett. ed Anfibi Mar Rosso, 1886, p. 18; Boettger, Kat. Rept. Mus. Senck. 1893, p. 51; Zool. Anz. xvi. 1893, p. 114.

*Agama colonorum* (non D. & Bibr.), Rüppell, Neue Wirbelth. 1835, p. 14, pl. iv.; Mus. Senck. iii. 1845, p. 302; Gray, Cat. Liz. B. M. 1845, p. 256; Blanford, Zool. Abyss. 1870, p. 449.

*Agama mutabilis*, Lefebvre, Abyss. vi. p. 198, pl. ii. fig. 2.

6 ♂, 3 ♂, and 1 juv. Hills behind Suakin.

4 ♂ and 5 ♀. Erkowit, Suakin.

Body elongate; head rather small, somewhat depressed; nostril tubular, directed



backwards and upwards, placed on the canthus rostralis. Ear larger than the eye-opening, exposed. Limbs well developed, wrist generally reaching to the snout or slightly in advance of it, or falling short of the nostril; tip of the fourth toe reaching the ear, falling short of it, or extending to the eye; tibia longer than the skull; fourth toe only a little longer than the third. Tail more than twice as long as the distance between the gular fold and the vent, broad at the base, laterally compressed beyond it. Scales on the head smooth, flat; generally no enlarged elongate scale on the mesial line of the snout; 10-11 upper labials; occipital generally large; well-developed rosettes of rather long spines on the sides of the head and neck; nuchal crest moderately developed in the male, consisting of rather long spines, feeble in the female. Scales on the body strongly keeled, shortly mucronate, 62-78 round the middle of the body and 40-54 along the mesial line of the back between the origin of the limbs. Ventrals smooth. Caudal scales much larger than the dorsal, arranged more or less verticillately and keeled above in the male.

A moderately well-developed gular pouch in the male. A single row of from 7-12 præanal pores present in both sexes.

In the male the head is generally brownish red spotted with greenish yellow, the enlarged line of scales running from behind the nostril under the eye being of the latter hue; eyelids brick-red, with a purple spot on the middle of the lower eyelid; gular pouch brilliant orange-red, and its sides much paler, spotted with yellow in longitudinal lines, and the rest of the under surface of the head and neck dusky, purplish red spotted with yellow; upper surface of the body dark olive, spotted with yellow, with indications of a longitudinal series of large yellow markings along the sides; under surface bluish, the chest more so, and spotted with yellow; palmar and plantar surfaces white. When excited, the entire upper surface of the trunk and of the tail become bright peacock-blue, more especially the tail, the body and the limbs being suffused with greenish; a longitudinal line of white and blue scales appears on the middle of the back, from the shoulders to the loins, and the bright orange-red of the pouch and the deep blue of the under surface of the neck and front of the shoulders become very vivid.

The female, from the nape to the loins, is yellowish olive or greenish olive, with three large lozenge-shaped dark orange-red markings on the back, one over the shoulder, another in the middle of the back, and one on the loins, each with a yellowish-olive spot in its centre; an orange-red narrow band before the first and behind the last dorsal marking; a series of large orange-red elongated spots along the sides of the body; the head is generally some shade of olive, or it may be even bluish, spotted with yellow and dark indigo-blue; dark blue bands are more or less present below the eyes; limbs and posterior part of the body and tail are yellowish olive; underparts white, with a few obscure longitudinal blue lines on the throat.

*Measurements of the largest male and female.*

♂. Snout to vent 126 mm., tail 220 mm.

♀.     "     "     95     "     "     170     "

The females in the *A. colonorum* group are, as a rule, smaller than the males.

The food of this species consists largely of beetles, with an admixture of other insects. Duméril and Bibron mention a specimen of *A. colonorum* that had been taken in a nest of Termites.

The specimens of *A. spinosa* in my collection were from the neighbourhood of Suakin, and were brought to me alive by the Hadendowahs, who said they obtained them on the hills and on the plateau at Erkowit. I did not observe it on the plain around Suakin or on the way to Tokar.

For many years this species was represented in the British Museum only by three specimens from Egypt: one presented by Sir J. G. Wilkinson and two by Mr. James Burton. It is impossible to conjecture from what part of Egypt Wilkinson obtained his specimen; but as the journeys of J. Burton are well known from the records he has left of them, preserved in the British Museum, I am inclined to think that he probably found them in his wanderings in the Eastern desert north of Keneh. It occurs also in the Sinaitic Peninsula. It has been recorded from Abyssinia and Shoa to the south.

It is known to the Hadendowahs as the *Woongailoom*.

This species is nearly allied to *A. hartmanni*, and perhaps more so to *A. bibronii*. The occipital is generally enlarged, but, like the other head-scales, it is liable to vary, and may only be slightly enlarged. The elongated scale on the front of the snout from its variable character is of no specific importance. *A. bibronii* has a tolerably well-developed fringe of pointed scales at the anterior border of the ear, and also more or less along the upper border as well. In *A. colonorum* and *A. hartmanni* there are scales occupying a similar position, but they are but little developed and reduced in number. In *A. spinosa* no such scales are present, but their place is taken by foliaceous rosettes of scales. In *A. spinosa*, beside the rosette at the front border of the ear, there is a group of spines behind the opening, three on the lateral aspect of the lower jaw, and two large ones on the sides of the neck. The scales in these positions are much more strongly developed than in *A. colonorum* and *A. hartmanni*, but they are not so foliaceous as in *A. bibronii*.

In the four species mentioned the dorsal scales are smaller than the caudals, and the former are nearly of equal size. They are perhaps on the whole largest in *A. bibronii*, which has 62-64 rows round the middle of the body; whereas in *A. colonorum* they vary from 60-80, in *A. spinosa* from 62-78, and in *A. hartmanni* from 74-84. In all, the dorsal scales are more or less rhomboidal, mucronate, imbricate,

and strongly keeled, with ridges formed by the keels converging towards the mesial line of the back.

The limbs and digits of *A. bibronii* are rather shorter than they are in the other species. In all the foregoing species the third and fourth toes are nearly equal, the latter being, as a rule, a little longer than the former.

With the exception of *A. spinosa*, the males of the foregoing species have no distinct gular pouch, but the skin of the throat is much plicate. This plication is so pronounced in *A. spinosa* (Pl. X. fig. 2) that it is entitled to be regarded as a short pouch.

While *A. bibronii* is confined to North-western Africa (Morocco, Algeria, and Tunisia), the Western *A. colonorum*, Daud., extends right across the continent<sup>1</sup> to within 60 miles of the shores of the Gulf of Aden<sup>2</sup>; and if *A. cariniventris*, Peters, is identical, as Dr. Tornier<sup>3</sup> says it is, with the lizards referred by Peters to *A. colonorum*, and if the latter, as understood by Peters, was the true *A. colonorum*, the distribution of this species ranges southwards on the eastern coast to Zanzibar. On the other hand, *A. hartmanni*, Peters, is known only from Abyssinia, Somaliland<sup>4</sup>, British East Africa<sup>5</sup>, German East Africa<sup>6</sup>, and Dongola in the Nile valley<sup>7</sup>.

Besides the last-mentioned species, four others also with equal keeled scales, the lines of carination being convergent towards the mesial line of the back, and with the other features of *A. colonorum*, have been described from Abyssinia and Somaliland. They are *A. rueppellii*, Vaillant<sup>8</sup>, *A. smithii*, Blgr.<sup>9</sup>, *A. lionotus*, Blgr.<sup>10</sup>, and *A. vaillanti*, Blgr.<sup>11</sup>

The first of these is distinguished from all the others by its larger scales, of which there are only 48 round the middle of the body, and 26-34<sup>12</sup>, according to M. Mocquard, between the origin of the limbs along the mesial line of the back, those on the tail being still larger. Its head is short, recalling that of *A. pallida*, and the nostril resembles that of *A. bibronii* and *A. hartmanni* in being placed below the canthus rostralis. It is also closely allied to *A. vaillanti*, but differs from it in having a more elongate body, much larger scales, and a nuchal crest. It is, however, further affined

<sup>1</sup> Peters, Mon. Berl. Ak. 1862, p. 271; Stejneger (Smithsonian Inst. no. 970, 1893); Proc. U.S. Nat. Mus. xvi. 1894, p. 717.

<sup>2</sup> Blgr. Ann. & Mag. N. H. (6) xvi. 1895, p. 167.

<sup>3</sup> Kriechthiere Deutsch-Ost-Afr. 1897, p. 29.

<sup>4</sup> Blgr. Ann. Mus. Civ. Genova, ser. 2, ii. 1885, p. 127; op. cit. xv. (xxxv.) 1895, p. 13; op. cit. xvii. (xxxvii.) 1896, p. 8 et p. 277; Proc. Zool. Soc. 1895, p. 533; op. cit. 1896, p. 214.

<sup>5</sup> Günther, Proc. Zool. Soc. 1894, p. 86.

<sup>6</sup> Op. cit. p. 29.

<sup>7</sup> Peters, Mon. Berl. Ak. 1869, p. 65.

<sup>8</sup> Révoil, Faune et Flore des Pays Comalis, Rept. & Batr. 1882, p. 6, pl. i.

<sup>9</sup> Proc. Zool. Soc. 1896, p. 213, pl. vii.

<sup>10</sup> L. c. p. 214, pl. viii.

<sup>11</sup> Ann. Mus. Civ. Genova, ser. 2, xv. (xxxv.) 1895, p. 12, pl. iii. fig. 2.

<sup>12</sup> Mém. Cent. Soc. Philom. 1888, p. 115\*.

to it in the proportions of its digits, as in both the third finger is longer than the fourth; this proportion, however, is reversed in the corresponding digits of the pes.

Fingers with these proportions are met with in *A. smithii* and *A. lionotus*, whereas in *A. bibronii*, *A. hartmanni*, *A. colonorum*, and *A. spinosa* the third and fourth fingers are equal, but occasionally the equality is not well defined in the last-mentioned species, and in it third fingers are met with that are longer than the fourth, so that much importance cannot be attached to the relative length of these fingers in this group.

*A. smithii*, Blgr., is only known from a single female. It is closely allied to *A. spinosa*, Gray, on the one hand, and also to *A. rueppellii*, Vaillant. *A. lionotus*, Blgr., is related in some respects to the South-African *A. planiceps*, but at the same time differs from it very materially—*e. g.*, its short and stout digits, feebly keeled dorsal scales, and larger rosettes on the sides of the head and neck. *A. lionotus* was obtained at an elevation of 2400 feet above the sea, close to the eastern side of the southern end of Lake Rudolf; and *A. smithii* 400 miles to the west between the Shebeli and Juba rivers, at an elevation of 700 feet <sup>1</sup>.

*A. lionotus* (♂) is provided with a remarkably large scute at the base of each claw. It will be observed from Pl. X. figs. 2 & 3 that a similar scute is present in *A. spinosa*, and that it is much more developed in the male than in the female. In the female *A. smithii* this scute is very small; but whether the females are always distinguished by a small and the males by a large unguis scute remains to be ascertained. The differences manifested by the sexes of agamoid lizards emphasize the necessity of accurately ascertaining the sexes of individuals described as new species by the actual inspection of the internal organs of generation, as it is impossible to place reliance on the absence or presence of præanal pores, or on the degree of development of femoral pores as a guide to sex.

The degree to which the tail is verticillated in the *A. colonorum* group varies considerably. In none of them do the verticils embrace the entire base of the tail as in *A. stellio* and *A. zonura*, Blgr.; but these two species are linked to a certain extent with *A. colonorum* and its allies by such species as *A. annectens* and *A. adramitana*.

I have mentioned the foregoing members of the *A. colonorum* group, as it is possible that some of them may be found to enter the Nile valley in the direction of Wádí Halfa.

<sup>1</sup> Through unknown African Countries (A. Donaldson Smith), 1897, Route Maps.



## AGAMA HARTMANNI, Peters.

*Agama savignyi* (non Dum. & Bibr.), Peters, Mon. Berl. Ak. 1862, p. 271.

*Agama hartmanni*, Peters, Mon. Berl. Ak. 1869, p. 65.

*Agama doriae*, Blgr. Ann. Mus. Civ. Genova, ser. 2, ii. 1885, p. 127; Cat. Liz. B. M. iii. 1887, p. 495;

Ann. Mus. Civ. Genova, ser. 2, xv. (xxxv.) 1895, p. 13; op. cit. xvii. (xxxvii.) 1896, p. 8;

op. cit. 1897, p. 277; Proc. Zool. Soc. 1895, p. 533; op. cit. 1896, p. 214; Günther, Proc.

Zool. Soc. 1894, p. 86.

Body elongate; head moderate, slightly depressed; nostril tubular, directed backwards and outwards, placed below the canthus rostralis; ear larger than the eye-opening, exposed. Limbs well developed; wrist reaches the nostril or may extend in advance of the snout; tip of the fourth toe reaches the ear, to between the ear and the eye, or may only be slightly in advance of the shoulder. Tibia longer than the skull; third and fourth toes nearly equal, the fourth slightly longer than the third. Tail more than twice as long as the distance between the gular fold and the vent, broad at the base, laterally compressed behind it. Scales on head smooth, flat; an elongate scale on the snout present, little developed, or absent. 8-13 upper labials; occipital enlarged. The rosettes of spines on the sides of the head and neck but little developed, the largest not half the diameter of the ear; nuchal crest slight. Scales on body strongly keeled, feebly mucronate, 67 to 88 round the middle of the body, and 40 to 50 along the mesial line of the back between the origin of the limbs. Ventrals smooth. Caudal scales much larger than the dorsals, arranged more or less verticillately and keeled above in the male.

A single row of 10-12 præanal pores, not present in the female. No gular pouch, but a longitudinal gular fold.

General colour, in alcohol, yellowish or olive above, spotted irregularly with brown and yellowish. A dark line from the lower border of the eye to the ear and another from its upper border, both prolonged on to the neck, and occasionally a yellow vertebral line along the trunk to the tail. Under surface of head spotted with brown; belly reticulated with dusky (female), or the whole under surface from the gular fold to the middle of the belly, including the sides of the body, shoulder and fore limb, brilliant blue (male).

It has been recorded from the District of Mount Kenia (Taita and Fuladoya), from Western Somaliland (Shaikh Hussein, 5000 ft.), from Ogaden District, Central Somaliland, from Northern Abyssinia (Karen, Bogos), and from Dongola on the Nile.

In 1869, Peters described this agamoid lizard from Dongola as *A. hartmanni*. As the type is in the Berlin Museum, I applied to Dr. Gustav Tornier for some information about it, as Peters' description gives no clue to its affinities. I have thus again to express my indebtedness to Dr. Tornier for his unstinted assistance, as he had specially made for my use two enlarged photographs of the head and two views, the size of nature, of the entire lizard. Dr. Tornier mentioned *A. bibronii* and *A. doriae*



as its nearest allies. Fortunately the types of the latter species are in the British Museum.

*Measurements &c. of the types of A. doriæ in the British Museum (in millim.).*

Sex.	Snout to vent.	Tail.	Length of head.	Breadth of head.	Tibia.	Pores.	Upper labials.	Scales round body.	Scales between origin of limbs.	Collar to vent.	Locality.
♂ ..	110	..	23	20	26	10	10+9	79	45	..	Karen, Bogos.
♂ ..	79	139	18	16	19	11	9+9	87	44	55	" "
♀ ..	87	..	19	16	21	..	10+9	84	42	..	" "
♀ ..	73	117 <sup>1</sup>	17.5	14.5	17	..	9+9	85	44	50	" "
♀ ..	75	..	16.5	14.6	17	..	9+9	88	46	..	" "
♀ ..	72	..	16.8	14	17.2	..	8+10	80	40	..	" "
♀ ..	66	..	16	14	17	..	9+8	84	42	..	" "
♂ ..	113	..	24	23	29	..	11+12 <sup>2</sup>	72	40	..	Taita.
♂ ..	80	..	20	17.5	21	..	10+11	70	44	..	Fuladoya.

The enlarged view of the head of *A. hartmanni* shows the nostril to be directed outwards and backwards and to be placed below the canthus rostralis. The scales on the upper surface of the head are smooth or very faintly keeled here and there. The enlarged scale on the snout is not present. There are 13 upper labials. The groups of spines on the sides of the head and neck are very small, but their presence is distinguishable; the tympanum is wholly uncovered. There is a slight nuchal crest, and I am informed by Dr. Tornier that there are 48 rows of scales along the dorsal line between the origin of the limbs, and 67 rows of scales round the middle of the body. The fourth toe is a little longer than the third, but so slightly that the two may be said to be subequal; it is as long as the snout. The type is a male with a row of præanal pores.

In one of the types of *A. doriæ* there are as many as 12 upper labials on one side of the head and in others 10 and 11, and by the highest of these numbers we are led on to the 13 upper labials found in the unique specimen of *A. hartmanni*. Mr. Boulenger, who has examined many examples of *A. doriæ*, gives the variation in the number of scales along the mesial line of the back between the origin of the limbs as 45-50, so that the number 48 found in *A. hartmanni* is overlapped by the highest of the numbers. In the types of *A. doriæ* I find that the scales round the body range from

<sup>1</sup> Seems to have been partially restored.

<sup>2</sup> Mr. Boulenger mentions a specimen from Ogaden with 12 upper labials on one side and 9 on the other.

70 to 88, but the difference between the lowest of these numbers and the 67 present in *A. hartmanni* is so slight as to be of no importance. In all the types of *A. doriæ* there are a few pointed scales at the anterior and upper borders of the ear, forming almost a short fringe in some, while in others they are reduced to two or three scales. In the enlarged figure of the head of *A. hartmanni* similar scales are present in that position.

From the foregoing facts I think it is evident that it is impossible to regard *A. doriæ* as distinct from *A. hartmanni*.

*A. bibronii* has its nostril in the same position as in *A. hartmanni*; it possesses a slight nuchal crest; the scales on the upper surface of the head are smooth or feebly keeled; it has 11 to 14 upper labials, 40 rows of scales along the back between the origin of the limbs, and 62 to 64 scales round the middle of the body. The third and fourth toes are equal and as long as the snout, measured, as in *A. doriæ*, from the posterior border of the eye. The only points apparently in which *A. bibronii* differs from *A. hartmanni* are the slightly larger rosettes of scales on the sides of the head and neck and the larger body-scales, which are scarcely smaller than the caudals, while in *A. hartmanni* they are decidedly smaller.

In the largest of the types of *A. doriæ* the scales on the nape pass gradually into those on the hinder part of the neck, but in the females the scales in that region are a little smaller than those behind them. In a male from Taita and another from Fuladoya the nuchal scales are perceptibly smaller than those of the back; but the difference is slight, and from the variations that occur no importance is to be attached to the slight differences in the size of these scales.

In *A. hartmanni* the rosettes on the side of the head and neck differ from those present in *A. bibronii*, *A. colonorum*, and *A. spinosa* in their little development. In *A. spinosa*, for example, 8 groups of rosettes bearing spiny scales can be counted, one at the anterior, another at the posterior border of the ear margin, 3 groups below and behind the ear on the lateral aspect of the angle of the lower jaw, a small group on the hinder portion of the temporal region, and two large groups on the side of the neck. In *A. hartmanni* there are no distinct rosette-like eminences at the anterior and posterior borders of the ear, their place being taken by simply enlarged pointed scales. On the temporal region there is a feeble rosette and two equally ill-defined ones behind and below the ear, the lowest being in a line with the angle of the mouth. The two rosettes on the neck are feebly developed, so that instead of 8 well-developed groups of rosettes as in *A. spinosa*, *A. bibronii*, &c., there are in reality only 5, the place of the others being represented by spines.

Owing to the almost elementary character of its head and neck spines, this species can never be mistaken for *A. spinosa*. From *A. colonorum* it is separated by its nostril being placed below the canthus rostralis, by its smaller head-spines and longer digits.

## AGAMA STELLIO, Linn. (Fig. 7.)

*Crocodile de terre*, Tournefort, Voy. du Levant, i. 1717, pl. p. 313.

*Le Stellion du Levant*, Cuv. Règ. An. ii. 1817, p. 32.

*Lacerta stellio*, Linn. Mus. Lud. Ulr. Reginæ, ii. 1764, p. 37; Hasselq. & Linn. Iter Palæst. 1757, p. 301; Syst. Nat. i. 1766, p. 361.

*Cordylus stellio*, Lam. Synop. Rept. 1768, p. 52.

*Stellio vulgaris*, Daud. Rept. iv. 1803, p. 16; Is. Geoffr. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 127, pl. ii. fig. 3; Dict. Class. Hist. Nat. xv. 1829, p. 627; Heyden, Rüppell's Atlas nördl. Afr. 1827, Rept. p. 6, pl. ii.; Guérin, Iconog. Règ. An. 1828, pl. vi. fig. 2; Bibr. et Bory St. Vincent, Expéd. Sc. Morée, Rept. 1833, p. 68, pl. xi. fig. 1 & pl. xiii. fig. 1; Duvernoy, Règ. An., Rept. (1835-46) pl. xiii. fig. 1; Dum. & Bibr. iv. 1837, p. 528; Rüppell, Mus. Senck. iii. 1845, p. 302; A. Dum. Cat. Rept. Paris Mus. 1851, p. 105; Steindach. Unger & Kotschy's Insel Cypren, 1865, p. 572; Shreiber, Herp. Europ. 1875, p. 469; Gasco, Viagg. Egitto, pt. ii. 1876, p. 107; Bedriaga, Bull. Soc. Imp. Nat. Mosc. 1879, no. 3, p. 38; Boettger, Ber. Senck. nat. Ges. 1879, p. 78, et 1880, p. 196; Lortet, Arch. Mus. Lyon, 1883, iii. p. 187.

*Agama cordylea*, Merr. Tent. Syst. Amph. 1820, p. 55.

*Stellio antiquorum*, Eichwald, Zool. Spec. iii. 1831, p. 187.

*Stellio cyprius*, Fitz. Syst. Rept. 1843, p. 85.

*Stellio cordylina*, Gray, Cat. Liz. B. M. 1845, p. 255; Günther, Proc. Zool. Soc. 1879, p. 741; Tristram, West. Palest., Rept. & Batr. 1884, p. 154.

*Agama stellio*, Blgr. Cat. Liz. B. M. i. 1885, p. 368; op. cit. iii. 1887, p. 496; Boettger, Kat. Rept. Mus. Senck. 1893, p. 52; Peracca, Boll. Mus. Torino, 1894, no. 167, ix. p. 7; Anderson, Herp. Arabia & Egypt, 1896, pp. 62, 101.

2 ♂, 2 ♀, and 3 juv. Gabari, Alexandria.

2 juv. Ramleh, Alexandria.

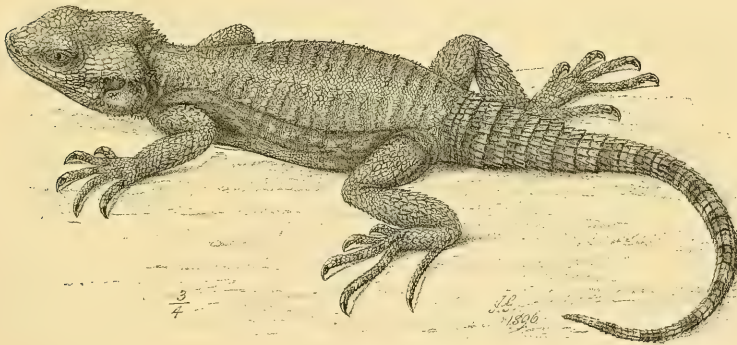
1 ♂ and 1 juv. Tor, Sinaitic Peninsula.

Body rather short and much depressed; head large, about half the length of the body from the nape of the neck to the base of the tail, swollen in the males from behind the eyes, triangular in form, with the canthus rostralis sharply defined; nasal shield large, flat, or slightly swollen, placed below the canthus rostralis, nostril directed outwards and backwards; eye smaller than the ear-opening, which is circular and quite exposed. Limbs well-developed and strong; wrist reaches to between the eye and the nostril, even to the snout, and the fourth toe to between the ear and eye or to the eye; fourth digit the longest. Tail considerably longer than the body and head, rather broad and depressed at the base, and rounded beyond. Skin on the neck in loose folds, the gular fold passing upwards in front of the shoulder-pit and along the side of the back with other folds below it. Head-scales moderately large, generally an elongate scale or two, larger than the others, on the mesial line of the snout, smooth or feebly keeled, but strongly keeled on the post-temporal region; occipital not enlarged; the

sides of the head before, behind, and below the ear with many short, strong, spiny scales, either single or in small groups or rosettes; the folds of the upper surface and sides of the neck and those on the sides of the body beset with single spines or small groups of spines. The body covered with minute granular scales, but with numerous enlarged keeled scales intermixed among them, especially on the mesial line of the back, and generally a single line of these enlarged scales from the occiput and continued to the anterior half of the back, with other irregular lines external to it; enlarged scales arranged, more or less, in longitudinal but more especially in transverse series, and of the latter there are from 20 to 24 between the shoulders and the base of the tail. Many of the enlarged scales have sharp points and some of the largest external to the mesial line of the back are trihedral. The scales on the centre of the throat strongly keeled. Ventrals small and perfectly smooth. Limbs covered above with scattered, large, keeled spinose scales. The tail with keeled scales, arranged in well-defined segments, each whorl consisting of two rings in the anterior half and three in the terminal half.

No gular pouch. A large præcloacal patch of actively secreting scales in the male, numbering occasionally as many as 60, and an elongated patch of similar structures on the mesial line of the abdomen.

Fig. 7.

*Agama stellio*, Linn.

Upper surface dark olive-grey or olive-brown, many of the scales on the side of the head and along the lower jaw yellow; throat of the male deep leaden bluish, paler in the female, and in both occasionally reticulated with darker lines; under surface dark greenish yellow; tail yellowish below, brownish above, with 12 to 14 brown bands.

♂. Snout to vent 284 millim., tail 170.



This well-known lizard is very common along the sea-face of the delta, and is especially numerous around Alexandria, where, when the sun is shining, there is scarcely a garden wall or a stony slope on which it may not be seen jerking its head after the fashion of its kind. It is extremely wary, and when disturbed seeks for shelter in the crevices of rocks and walls and among stones. I unexpectedly found it abundant under old flattened-out oil-tins lying among heaps of rubbish by the sides of the road in the market gardens at Gabari. When pursued it betook itself to the nearest tree, running up the highest palm with the greatest ease.

I have neither observed it in the neighbourhood of Cairo nor to the south of that city.

This species is distributed over S.E. Europe, the islands of Cyprus, Mykonos, Milo, Cephalonia, Paro, Delos, Chios, &c., also over Asia Minor, Syria, Northern Arabia, the Sinaitic Peninsula, and the northern coast-line of Egypt<sup>1</sup>. A specimen has been recorded from Tetuan, on the African coast, to the east of the Straits of Gibraltar, but Mr. Boulenger suggests that it may probably have been imported.

It is known to the Arabs as حردون = *hardun*.

The excrement of this lizard was in olden times highly prized in the east as a precious cosmetique, but it has now wholly fallen into disuse. It was known under the names of *Cordylea* or *Crocodilea* and *Stercus lacerti*.

The lizard *A. annectens*, Blanford<sup>2</sup>, which serves to connect the "Stellio" section of the genus with such forms as *A. planiceps*, Peters, and through it with the *A. coloratum* group, occurs in Abyssinia and in Western Somaliland. On the Goolis Mountains, inland from Berbera, another allied form, *A. phillipsii*<sup>3</sup>, Blgr., is found; and on the coast of Massowah, and also in the centre of Abyssinia, at an elevation of 7000 ft., and in Western Somaliland, at 5000 ft. above the sea, still another, viz. *A. cyanogaster*<sup>4</sup>, Rüppell, occurs. According to A. Duméril's Catalogue, the latter has also been obtained in Arabia, if Botta's specimen was really from that locality, which seems doubtful, as A. Duméril, in the introduction to his Catalogue, states that M. Botta's collections were made in the region of the Nile.

In Western Somaliland there is an interesting form, *A. zonura*, Blgr.<sup>5</sup>, that serves, according to Mr. Boulenger, to link the "Stellios" with the somewhat remarkable lizard *A. batillifera*<sup>6</sup> (also from Somaliland), which he considers should be regarded as the type of a subgenus *Xenagama*, on account of the extreme flattening and abbreviation

<sup>1</sup> The lizard mentioned in Lefebvre's Voy. en Abyss. vi. Zool. p. 201, under the name of *Stellio vulgaris*, may probably be *A. annectens*, Blanford, Zool. of Abyss. 1870, p. 446.

<sup>2</sup> Zool. Abyss. 1870, p. 446, fig.

<sup>3</sup> Ann. & Mag. N. H. (6) xvi. 1895, p. 167, pl. vii. fig. 3.

<sup>4</sup> Neue Wirbelth. 1835, Rept. p. 10, pl. v.

<sup>5</sup> Proc. Zool. Soc. 1895, p. 533, pl. xxix. fig. 3.

<sup>6</sup> Faune et Flore des Pays Çomalis, 1882, Rept. & Batr. p. 10, pl. ii.



of its tail. I have mentioned these species as it is not at all improbable that some of them may be found to enter the valley of the Nile or to extend to the north along the mountains to the west of Suakin.

*Synopsis of the Species found in Egypt.*

- I. Occipital not enlarged. Caudal scales not forming annuli. No enlarged groups of spines on the sides of the head and neck. Dorsal scales unequal.
  - A. Fourth toe the longest.
    - a. Scales on the upper surface of the hind limb equal or nearly so.
      - (1) Ventrals smooth or feebly keeled. A small gular pouch in the male . . . . . *A. mutabilis.*
      - (2) Ventrals strongly keeled. A large pouch in the male and female. *A. flavimaculata.*
    - b. Scales on the upper surface of the hind limb, with larger scales intermixed; smaller dorsal scales smooth or indistinctly keeled. No gular pouch . . . . . *A. pallida.*
  - B. Third toe the longest. Median dorsal scales the largest, smooth or keeled . . . . . *A. sinaita.*
- II. Occipital enlarged. Caudal scales forming annuli. Groups of enlarged spiny scales on the side of the head and neck.
  - (1) Groups of cephalic and cervical spines well developed,  $\frac{2}{3}$  as long as the diameter of the ear-opening; 62-78 rows of scales around the body . . . . . *A. spinosa.*
  - (2) Groups of cephalic and cervical spines feebly developed, longest spines less than  $\frac{2}{3}$  the diameter of the ear-opening; 74-84 rows of scales round the body . . . . . *A. hartmanni.*
- III. Occipital not enlarged. Caudal scales divided into segments composed of two or more rings of scales.
  - Sides of head and neck with short spines . . . . . *A. stellio.*

## UROMASTIX.

*Uromastix*, Merrem, Tent. Syst. Amph. 1820, p. 56.

Body depressed, no dorsal or nuchal crest, covered with granular or small smooth scales, smaller than the ventrals, largest on the head; head short, triangular, canthus rostralis obtuse, the nostril near the end of the snout; tympanum naked, vertically elongate; loose folds of skin on the neck; a gular fold; no gular pouch. Tail broad, depressed, strongly segmented, each segment consisting of quadrangular, strong, spinose scales, in contact on the upper surface with the neighbouring segments, or separated from them on the upper surface by minute scales. Limbs short and stout, with strong claws; hind limb with spinose tubercles. Præanal and femoral pores.

No canines; the incisor teeth disappear with age, their place being taken in the upper jaw by a beak-like growth of the premaxillaries, covered with enamel. The anterior molars also disappear above and below, and the jaw becomes a sharp cutting-edge immediately behind the premaxillary beak.

The term "Dabb," دَبَّ, is applied by the Arabs to the species of this genus.

The African species of *Uromastix* belong to that section of the genus in which the segments on the upper surface of the tail are not separated from each other by interposed small scales. The species are *U. ocellatus*, Licht., *U. ornatus*, Heyden, *U. ægyptius*, Hasselq. & Linn., and *U. acanthinurus*, Bell.

There are two subdivisions of this section, viz. one in which the tail is encircled by the segments, which are as long on the under as on the upper surface; and another in which this is not the case, as two or more transverse rows of scales on the under surface correspond to one of the dorsal segments. *U. ocellatus*, Licht., and *U. ornatus*, Heyden, belong to the first of these subdivisions, and *U. ægyptius*, Hasselq. & Linn., and *U. acanthinurus*, Bell, to the second. An Asiatic species, *U. microlepis*, Blanford, also belongs to this subdivision.

The other primary section of the genus, in which the spinose segments on the upper surface of the tail are separated from each other by interposed small scales, is represented by three species, *U. hardwickii*, Gray, *U. asmussii*, Strauch, and *U. loricatus*, Blanford, confined to Asia.



UROMASTIX OCELLATUS.

Fig. 1 ♂, Fig. 2 ♀, Suakin.



UROMASTIX OCELLATUS, Licht. (Plate XII.)

*Uromastix ocellatus*, Licht. Doubl. Berl. Mus. 1823, p. 107; *part.*, Fitz. Syst. Rept. 1843, p. 86; Peters, Mon. Berl. Ak. 1862, p. 271; *part.*, Peters, Sitzb. Ges. naturf. Fr. 1882, p. 45; Blgr. Cat. Liz. B. M. iii. 1887, p. 499; Anderson, Herp. Arabia & Egypt, 1896, p. 101. *Uromastix ornatus* (non Heyden), Gray, Cat. Liz. B. M. 1845, p. 261; Blgr. Cat. Liz. B. M. i. 1885, p. 406.

13 ♂, 15 ♀, and 1 juv. Neighbourhood of Suakin.  
1 ♀. Wādī Halfa. Major Henry d'Alton Harkness.

Ear with no enlarged conical scales at its anterior border. Body-scales very small, quadrangular, flattened, 260 round the middle of the body including the ventrals; about 95 to 100 ventrals between the inguinal and gular folds; no enlarged tubercles on the flanks or on the fore limb, but with a few irregularly shaped pointed scales on the thigh, and enlarged conical tubercles on the tibial portion of the limb. Tail gradually tapered to a point, much depressed. Caudal segments strongly spinose laterally.

In life, the colours are very vivid in the male; in some the entire upper surface of the head and body is rich light red vermiculated with blackish, whereas the head in some is dark olive-green spotted with red, and in others red spotted with green. Seven or eight transverse bands or chains of round white spots on the back, each spot margined with black and its centre frequently occupied by a dusky yellowish spot. Sides of the neck, body, and tail dark green, which in some males is prolonged upwards on to the back between the chains of spots. Upper surface of the limbs dusky green. Throat and chest generally light green, or vivid blue from the chin along the throat; the under surface of the body yellow, with the green of the sides prolonged inwards on to the belly in transverse bands, or without markings. Upper surface of the tail bluish green in some, suffused with red in others; spines greenish; under surface of limbs and tail whitish.

In the females the colours are much less vivid, there never being any bright red on the back, and the tail being uniformly dusky yellow and green.

The young animal is dusky brown, and in it the general arrangement of the colour is well seen. Eight dusky bands of varying extent are prolonged inwards towards the mesial line of the back, those on the neck being little more than spots. They are separated from one another by very pale dusky areas, on which the white black-edged ocelli occur. The tail is paler than the body; the underparts are whitish, spotted with dusky; three black bands radiate downwards from the eye.

Measurements of an adult male:—Snout to vent 150; vent to tip of tail 138 millim.

This is the smallest of the African species of the genus and the most brilliantly coloured. It is very common in some parts of the Suakin plain, judging from the number of specimens brought to me. I kept a few of them alive for some weeks in the Zoological Garden in Cairo, feeding them on clover, on which they appeared to



thrive. They were very torpid in the mornings, and never made any attempt to feed until they had lain for some time under the full influence of the sun, when they became very active.

I sent one of my specimens to Dr. Tornier, and I am indebted to him for the information that it perfectly agrees with Lichtenstein's type of the species from Nubia, preserved in the Berlin Museum.

The two lizards referred by Gray to *U. ornatus*, Heyden<sup>1</sup>, are identical with the foregoing specimens, which are distinguished from Heyden's species by their smaller scales, by the entire absence of any enlarged scales along the anterior border of the ear, by their more elongate and more spinose tails, shorter caudal whorls, and by their coloration. It is impossible to say in what part of Egypt Burton obtained his specimens; but as he made more than one journey in the Eastern desert, that is to the east of the Nile, it is likely that they came from that region, as it is known that other species found around Suakin spread northwards along that area.

From Suakin it extends to Wádí Halfa, whence Peters recorded it, in 1862; and among my specimens there is one from the same locality presented to me by Major Harkness. Peters mentions its presence also in the island of Socotra.

It is known to the Hadendowahs as the *Kurfeefanope*.

#### UROMASTIX ORNATUS, Heyden. (Plate XIII.)

*Uromastix ornatus*, Heyden, Rüppell's Atlas nördl. Afr., Rept. 1827, p. 1, pl. i.; Wagler, Syst. Amph. 1830, p. 145; Schinz, Naturgesch. Abbild., Rept. 1833, p. 91, tab. 31. fig. 3; Dum. & Bibr. iv. 1837, p. 538; Rüppell, Mus. Senck. iii. 1845, p. 303; A. Dum. Cat. Rept. Paris Mus. 1851, p. 108; *part.*, Peters, Sitz. Ges. nat. Fr. Berl. 1882, p. 45; Tristram, West. Palest., Rept. & Batr. 1884, p. 154; Boettger, Kat. Rept. Mus. Senck. 1893, p. 55; Werner, Verh. zool.-bot. Ges. Wien, xliii. 1894, p. 359; Anderson, Herp. Arabia & Egypt, 1896, p. 79.

*Uromastix ocellata*, Fitz. Syn. Rept. 1843, p. 86.

1 ♂. Mount Sinai.

Ear with enlarged conical scales at its anterior border. Body-scales much larger than in the previous species, flat, smooth, and almost subimbricate, 220 round the middle of the body including the ventrals; ventrals large, 80 to 85 between the inguinal and gular folds; no enlarged tubercles on the flanks or on the fore limb, but very large spinose scutes on the hind limb. Tail broad and rather abruptly pointed, not round, depressed; segments rather long antero-posteriorly, not markedly spinose.

Head dark grass-green in life, somewhat yellowish on the sides and marbled with darker; body green, tinged with reddish violet; 6 or 7 irregular, broad, entire or

<sup>1</sup> Cat. Liz. B. M. 1845, p. 261.



UROMASTIX ORNATUS.

♂, Mount Sinai.





UROMASTIX ÆGYPTIUS.

♂, Suburbs of Cairo.





broken up citron-yellow cross-bands, the scales of these areas with dark points; tail greyish green shading into reddish; limbs dark grass-green marbled with yellow. Digits greyish brown. (*Heyden*.)

General colour, in alcohol, yellow; transverse, irregularly outlined, dusky bars on the sides, eight in number, from the neck to the base of the tail, but not meeting on the mesial line of the back; the upper surface of the back vermiculated with reddish lines tending to form ocelli. Head suffused with deep purple on the sides, and below the eye with purple, tending to form vertical bars. Under surface of the head from the chin to the gular fold bluish green, broadly reticulated with dark purple and dark blue; the sides of the belly and under surface of the limbs yellowish, covered with bluish-black reticulations. Upper and under surface of tail bright yellow.

♂. Snout to vent 210 millim.; vent to tip of tail 175 millim.

The specimen of this lizard in my possession came from an altitude of 500 mètres in the granitic region of Mount Sinai.

Duméril and Bibron in their description of *U. ornatus* say erroneously that the type of the species was from North Africa, whereas its author, Heyden, not Rüppell as stated by them, mentions that it came from Mohila, on the east coast of the Red Sea. They also record that in the Paris Museum there were two magnificent examples sent from Egypt by Botta, the travelling naturalist to the Museum. According to the dimensions given by them, it would appear, if their identification of Botta's specimens with *U. ornatus* was correct, that this species attains to a very great size, viz. to nearly three feet in length.

Its presence in Egypt has yet to be verified. It occurs not only in the Sinaitic Peninsula and Arabia proper, but extends also into the southern desert of Palestine according to Canon Tristram.

In appearance it is remarkably like *U. (Aporoscelis) benti*.

UROMASTIX ÆGYPTIUS, Hasselq. & Linn. (Plate XIV.)

*The Dhab or Dab*, Shaw's Travels, 1738, p. 250.

*The Dhab*, Bruce's Travels, v. App. 1790, p. 198.

*La Fouette-queue d'Égypte*, Cuv. Règ. An. ii. 1817, p. 32.

*Lacerta ægyptia*, Hasselq. & Linn. Iter Palæst. 1757, p. 302; Forsk. Descr. An. &c. 1775, p. viii et p. 13; Donndorff, Beytr. iii. 1798, p. 136.

*Stellio spinipes*, Daud. Rept. iv. 1803, p. 31; Is. Geoff. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ?1827, p. 125, pl. 2. fig. 3; Griffith's An. King. ix. 1831, p. 121, plate.

*Uromastix spinipes*, Merr. Syst. Amph. 1820, p. 56; Heyden, Rüppell's Atlas nördl. Afr., Rept. 1827, p. 5; Is. Geoff. St.-Hil. Dict. Class. d'Hist. Nat. xv. 1829, p. 627; Wagler, Syst. Amph. 1830, p. 145; *part.*, Gray, Syn. Rept. Griffith's An. King. ix. 1831, p. 61; Wiegmann, Herp.

Mexic. 1834, p. 17; Dum. & Bibr. iv. 1837, p. 541; Duvernoy, Cuv. Règ. An., Rept. 1847, pl. xiii. fig. 2; Fitz. Syst. Rept. 1843, p. 86; Gray, Cat. Liz. B. M. 1845, p. 261; Rüppell, Mus. Senck. iii. 1845, p. 303; A. Dum. Cat. Rept. Paris Mus. 1851, p. 108; Klunzinger, Zeitschr. Ges. Erd. Berl. xiii. 1872, p. 94; Schreiber, Herp. Europ. 1875, p. 474; Gasco, Viagg. Egitto, pt. ii. 1876, p. 107; Günther, Burton's Gold Mines of Midian, 1878, p. 398; Peters, Mon. Berl. Ak. 1880, p. 307; Blgr. Cat. Liz. B. M. i. 1885, p. 407; op. cit. iii. 1887, p. 499; Ann. & Mag. N. H. (5) xx. 1887, p. 407; Tristram, West. Palest., Rept. & Batr. 1884, p. 154; Boettger, Kat. Rept. Mus. Senck. 1893, p. 55; ? Olivier, Mém. Soc. Zool. France, vii. 1894, p. 110.

*Mastigura spinipes*, Fleming, Phil. Zool. ii. 1822, p. 277.

*Uromastix aegyptius*, Anderson, Herp. Arabia & Egypt, 1896, p. 101.

1 ♀. Between Suez and Ismailia.

1 ♀. Plain of Kafr Gamus.

1 ♂. Beltim. Dr. J. G. Rogers.

1 ♀. Suburbs of Cairo.

Ear with enlarged scales at its anterior border. Body covered with minute conical scales, 320 round the middle of the body including the ventrals; ventrals small, 140 between the inguinal and gular folds; enlarged tubercles on the flanks, on the outside of the forearm, and on the outer upper surface of the hind limb; tail depressed, gradually tapered; caudal segments strongly spinose above.

Yellowish or greenish olive above, suffused with bluish green on the labials and on the front of the head; the upper surface of the limbs punctulated with dusky brown. Under surface of the head, the loose skin of the neck, and belly reticulately marked with brown. Tail yellow above, brighter yellow below.

♂. Snout to vent 356 millim.; vent to tip of tail 255 millim.

This lizard is generally found along the lines of drainage of the desert, as it there finds the sparse vegetation on which it lives. In such localities it constructs deep tortuous burrows, some of which I have traced to a depth of 4 feet through very hard sand. It is also found in the deep water-worn wādīs, where there is frequently a better supply of vegetable food than in the open desert. It is said to feed in the early morning and at sundown. It is common, for example, on the great plain of Kafr Gamus, beyond Abbasiyeh, where it is associated with *Agama pallida*.

It is distributed over the desert region of Northern Egypt. Its extension to the south is unknown, but it is said to extend into Nubia. Peters has recorded it from the south of Cyrenaica; and M. E. Olivier mentions that he captured an individual, in 1892, upon the hills to the north of Biskra, but states that it is very rare in Algeria; the specimen, however, from Biskra, recorded by Dr. Günther in 1859 as *Uromastix spinipes*, proved to be *U. acanthinurus*.

It also occurs in the dry desert portions of the sea-face of the delta, and is likewise found in the Sinaitic Peninsula, Southern Judea, Arabia (Midian and Maskat), and in the island of Crete.



UROMASTIX ACANTHINURUS.

♂. Dairat, Eastern Tunisia.



Wilkinson<sup>1</sup> includes it in his list of animals known to the ancient Egyptians. A figure of a lizard with a thick tail, that may possibly have been intended for an *Uromastix*, occurs in Rosellini's great work<sup>2</sup>.

The species was figured and described by Belon<sup>3</sup> under the name of *Crocodile terrestre ou Crocodile d'Arabie*.

It is generally seen in the possession of conjurers, owing to the mildness of its disposition and its striking appearance.

UROMASTIX ACANTHINURUS, Bell. (Plate XV.)

*Uromastix acanthinurus*, Bell, Zool. Journ. i. 1825, p. 457, pl. xvii.; Wagler, Syst. Amph. 1830, p. 145; Gervais, Ann. Sc. Nat. (2) vi. 1836, p. 309; Dum. & Bibr. iv. 1837, p. 543; Fitz. Syn. Rept. 1843, p. 86; Rüppell, Mus. Senck. iii. 1845, p. 303; Gray, Cat. Rept. B. M. 1845, p. 262; Guichenot, Explor. Sc. Alg., Rept. v. 1850, p. 8; A. Dum. Cat. Rept. Paris Mus. 1851, p. 109; Strauch, Mém. Ac. Sc. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 30; Boettger, Kobelt's Reiseerin. Alg. und Tunis, 1885, p. 465; Kat. Rept. Mus. Senck. 1893, p. 55; Blgr. Cat. Rept. B. M. i. 1885, p. 406; Trans. Zool. Soc. xiii. 1891, p. 119; Anderson, Proc. Zool. Soc. 1892, p. 12; Werner, Verh. zool.-bot. Ges. Wien, xlii. 1892, p. 354; op. cit. 1894, xlv. p. 79; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 110; Anderson, Herp. Arabia & Egypt, 1896, p. 112.

*Uromastix spinipes*, part., Gray, Syn. Rept. Griffith's An. King. ix. 1831, p. 61; Günther, Proc. Zool. Soc. 1859, p. 470; Tristram, Proc. Zool. Soc. 1859, p. 475.

*Uromastix dispar*, Heyden, Rüppell's Atlas nördl. Afr., Rept. 1827, p. 5; Gray, Syn. Rept. Griffith's An. King. ix. 1831, p. 61.

*Uromastix temporalis*, Valenc. Compt. Rend. Ac. Paris, xxxix. 1854, p. 89.

Ear with enlarged conical scales at its anterior border. Body-scales more or less quadrangular, much larger than in the previous species, 160 round the middle of the body, including the ventrals; 80 to 90 ventrals between the inguinal and gular folds; no enlarged tubercles on the flanks or on the fore limb, but a few on the pelvic region. Tail strongly depressed, rather short, abruptly tapered, markedly spinose.

Upper surface brownish yellow or olive above, spotted or reticulated with reddish brown or blackish. Under surface finely mottled with brownish olive, so much in some as almost to be uniformly dusky below, or broadly irregularly reticulated with yellow or olive-brown. This latter coloration is generally associated with a greyish-yellow upper surface, spotted with reddish brown, and in specimens of this coloration there is sometimes a pale dorsal band margined with blackish. The upper surface of tail yellowish, generally much mottled with brown or even with greenish.

♂. Snout to vent 215 millim.; vent to tip of tail 125 millim.

<sup>1</sup> Ancient Egyptians, iii. p. 263.

<sup>2</sup> Op. cit. i. pl. MR. lxxxi.

<sup>3</sup> Op. cit. p. 38.



This species is closely allied to *U. ægyptius*, so much so that it has sometimes been mistaken for it. It is, however, distinguished from it by its decidedly larger scales and by the absence of tubercles on the flanks, although a few are present above the origin of the hind limbs. It appears to be the western representative of *U. ægyptius*. M. E. Olivier, in his Catalogue of the Reptiles and Batrachia of Algeria, includes both species, but his description of the specimen referred to *U. ægyptius* is not sufficiently explicit to carry conviction that the specimen was correctly determined.

I have never met with this species in Egypt myself, but I have examined four specimens in the Frankfort Museum and another in the Paris Museum, all of which are said to have been obtained by Rüppell in Egypt. Heyden states that the types of his *U. dispar*=*U. acanthinurus*, Bell, were obtained by Rüppell in the desert between Dongola and Ambukol, where it is known as "Dendene." Now that this region is once more under the sway of Egypt, it is to be hoped that some British officer in the service of H.H. the Khedive will find sufficient leisure to make known its zoological riches.

Olivier states that this species occurs throughout the stony parts of the Sahara, where it lives in fissures in the rocks and in holes in the ground.

#### *Synopsis of African Species.*

Caudal segments in contact with each other on the upper surface.

##### I. Segments forming regular annuli above and below.

Body-scales small.

Ear without denticulations . . . . . *U. ocellatus*, Licht.

Body-scales larger.

Ear denticulated in front . . . . . *U. ornatus*, Heyden.

##### II. Segments not forming regular annuli above and below.

Body-scales almost granular.

Enlarged tubercles on the flanks . . . . . *U. ægyptius*, Hasselq. & Liun.

Body-scales well-defined.

No enlarged tubercles on the flanks . . . . . *U. acanthinurus*, Bell.

## VARANIDÆ.

*Varanidæ*, Cope, Proc. Ac. Philad. 1864, p. 227.

Body long, rounded; no dorsal crest. Head narrow, pointed, covered with small polygonal scales. Tongue very long, bifid, retractile, sheathed at the base. Teeth dilated at base, adnate to the inner side of the jaws; no palatine teeth. Eyelids well developed. Ear distinct. Nostril between the eye and the snout. Limbs strong. Scales arranged transversely, small, roundish, juxtaposed, each surrounded by a small circular fold of granules; ventrals squarish. Tail long. Rudimentary preanal pores occasionally present<sup>1</sup>.

The osteological features of this family, according to Cope and Boulenger<sup>2</sup>, are a single, long, narrow premaxillary; coalesced nasals; two frontals; a single parietal; a supraorbital bone; postorbital arch incomplete; a bony postfronto-squamosal arch; widely separated pterygoids and palatines; infraorbital fossa bounded by the pterygoid, palatine, and transverse bone, the maxillary being excluded. No dermal cranial ossifications. Clavicle slender; interclavicle anchor-shaped.

It is represented by a single genus.

## VARANUS.

*Varanus*, Merrem, Tent. Syst. Amph. 1820, p. 58.

Daudin included the two lizards *V. griseus* and *V. niloticus* in the genus *Tupinambis*, to which he also referred the so-called *sauvegardes* of the New World. Maria Sybilla Marien, as pointed out by Cuvier, was the first to use the term *sauvegarde*, but she was careful to state that she could not explain how it had come to be applied to these lizards. Seba either invented the explanation that the *teyu-guaçu* and its allies were called *sauvegardes* because they uttered a whistling sound as a warning to man of the approach of crocodiles and caimans, or he had learned it from some traveller who had wished to explain the term. It is possible that the *teyu-guaçu* may utter the foregoing sound of alarm when it sees one of these saurians approaching it, but that it does so for the reason assigned is absurd. Unfortunately the cognate term "*Monitor*" has been applied to the two Egyptian lizards, from their having been at first associated by Daudin with the varanoid-like *Teiidæ*. It is needless to say that this term, as applied to them, is equally misleading.

<sup>1</sup> Proc. Zool. Soc. 1895, p. 643.

<sup>2</sup> Ann. & Mag. N. H. (5) xiv. 1884, p. 120; Cat. Liz. B. M. ii. 1885, p. 303.

## VARANUS GRISEUS, Daud. (Plate XVI.)

- Monitor terrestre de Égypte*, Cuv. Règ. An. ii. 1817, p. 25.  
*Tupinambis griseus*, Daud. Rept. viii. 1803, p. 352.  
*Varanus scincus*, Merr. Tent. Syst. Amph. 1820, p. 59; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 26.  
*Monitor scincus*, Licht. Doubl. Berl. Mus. 1823, pp. 91 & 107; Schlegel, Abbild. 1837-44, p. 69.  
*Psammosaurus griseus*, Fitz. Neue Class. Rept. 1826, p. 50; Rüppell, Mus. Senck. iii. 1845, p. 301; Eichw. Nouv. Mém. Soc. Nat. Mosc. ix. 1851, p. 416.  
*Tupinambis arenarius*, Is. Geoffr. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 123, pl. iii. fig. 2 et pl. vi. figs. 14, 15.  
*Psammosaurus caspius*, Eichw. Zool. Spec. iii. 1831, p. 190; Faun. Casp.-Cauc. 1842, p. 60, pls. vii.-ix.; Blanford, Eastern Persia, ii. 1876, p. 359.  
*Monitor (Psammosaurus) scincus*, Gray, Syn. Griffith's An. King. ix. 1831, p. 27.  
*Varanus arenarius*, Dum. & Bib. iii. 1836, p. 471; Guichenot, Explor. Sc. Alg., Sc. Phys. Zool. v. 1850, p. 6; Peters, Mon. Berl. Ak. 1862, p. 271; De Filippi, Viagg. Pers. 1865, p. 352; Gasco, Viagg. in Egitto, pt. ii. 1876, p. 105.  
*Psammosaurus arenarius*, Parenti e Picaglia, Rett. ed Anfibi Mar Rosso, 1886, p. 26.  
*Psammosaurus scincus*, Wagler, Syst. Amph. 1830, p. 165; Gray, Ann. & Mag. N. H. i. 1838, p. 392; Blyth, Journ. As. Soc. Beng. xxiv. 1855, p. 715; Theobald, Journ. As. Soc. Beng. xxxvii. 1868, extra no. p. 20; Jerdon, Proc. As. Soc. Beng. 1870, p. 70; Anderson, Journ. As. Soc. Beng. xl. 1871, p. 30; Blanford, Proc. Zool. Soc. 1881, p. 677; Tristram, Fauna West. Palest., Rept. & Batr. 1884, p. 148; Boettger, Kobelt's Reiseerin. Alg. u. Tunis, 1885, p. 465.  
*Varanus arenaceus*, Gervais, Ann. Sc. Nat. (3) x. 1848, p. 204.  
*Varanus ornatus (non Daud.; non Gray)*, Carlyle, Journ. As. Soc. Beng. xxxviii. pt. ii. 1869, p. 192.  
*Monitor griseus*, Peters, Mon. Berl. Ak. 1870, p. 109.  
*Varanus (Psammosaurus) arenarius*, Bedr. Bull. Soc. Nat. Mosc. 1879, no. 3, p. 40.  
*Varanus griseus*, Blgr. Cat. Liz. B. M. ii. 1885, p. 306; Trans. Linn. Soc. Lond., Zool. v. 1889, p. 99; Fauna Brit. Ind., Rept. 1890, p. 163; Trans. Zool. Soc. xiii. 1891, p. 121; Boettger, Zool. Jahrb. iii. 1888, p. 904; Kat. Rept. Mus. Senck. 1893, p. 49; Anderson, Proc. Zool. Soc. 1895, p. 636; Herpet. Arabia & Egypt, 1896, pp. 34, 101; Zander, Zool. Garten, xxxvi. 1895, p. 298; Werner, Verh. zool.-bot. Ges. Wien, xlv. 1894, p. 79; Francaviglia, Boll. Soc. Rom. Zool. v. 1896, p. 46.  
1 ♀. Suez.  
1 ♂. Desert N.E. of Cairo.  
1 ♀. Gizeh Desert.  
1 ♀. Tel el Amarna. Prof. W. M. Flinders Petrie, D.C.L.  
1 ♂ and 1 juv. Suakin. Surgeon-Captain Penton, D.S.O.  
2 ♂ and 2 ♀. Suakin.  
1 ♀. Tokar.

Teeth acute, compressed. Snout slightly depressed at the tip. Canthus rostralis moderately defined. Nostril oblique, rather large and crescentic, close to the eye, its



VARANUS GRISEUS.  
♂, Suburbs of Cairo.





distance from the end of the snout being about four times greater than the interval between it and the eye. Tail rounded at the base, slightly compressed posteriorly; no dorsal ridge. Digits rather short; claws strong and curved. Scales on the upper surface of the head, including the supraoculars, very small, juxtaposed, smooth, generally hexagonal. Scales on the body and limbs small, rounded or oblong, sometimes feebly keeled, larger than ventrals, those on the sides of the neck generally conical; ventrals smooth, 110-125 between the fold of the neck to the groin. Caudal scales small, more or less keeled above and below.

General colour sandy yellow, with narrow brownish longitudinal lines varying in intensity along the side of the neck, and similarly coloured bands or lines across the back and tail, becoming lost in some adults towards the tip; the upper surface of the body sometimes with yellow spots. The young is generally pale rufous yellow above, with six broad deep black cross-bands on the back, each prolonged on to the sides as two curved lines. A narrow black line from the eye over the ear to the sides of the neck, another from before and behind the eye along the neck to the front dorsal cross-band; two faint interrupted lines below the ear to the shoulder; a few narrow blackish lines and spots on the snout, on the sides of the head before the eye, and also on the lower jaw. The areas between the black dorsal bands are marked with yellow spots arranged transversely, sometimes forming bands, one in the centre, between two black bands, and one margining each black band. From behind the limbs to the tip of the tail there may be as many as 28 deep black bands, each about half as narrow as the pale intervening interspaces, but not passing on to the under surface of the tail. The rings of colour on the tail are subject to considerable variation. In North Africa I have never observed fewer than 19, whereas at Karachi they sometimes fall as low as 8, at Agra to 12, and in Afghanistan and Bushire to 15. The limbs are marbled with yellow areas, the darker interspaces finely dotted with black. Underparts pale yellow.

It attains to about four feet in length.

This lizard does not occur on the alluvium of Egypt as a rule, but confines itself to the desert wádís and *khors* supporting a sparse vegetation, and to plains, like that at Suakin, covered more or less with grass and shrubs. In such localities it finds an abundant supply of food in the small rodents and lizards that frequent them. Along the banks of the Nile where the desert approaches the river it is said to eat the eggs of the crocodile; and judging by the avidity and dexterity with which it swallows fowl's eggs in confinement, without breaking them, it is probable that it is not only destructive to crocodile's eggs but also to those of birds and other reptiles. Dr. A. Zander says that the strength of its digestive powers is marvellous, as although the specimens he kept in confinement swallowed all animals entire, he never found the remains of bones among their excreta, but only traces of feathers. I have represented this lizard in the attitude it assumes when alarmed and on the defensive. The head is raised, the mouth is held open in a menacing manner, showing the deep purple-

black lining of the back part of the mouth, the throat is puffed out, and the body becomes greatly expanded by the inflation of the lungs. The tail is curved, in the form of the letter S, to the side away from the danger threatening it; and if it is still nearer approached while in this attitude, the chest is contracted, the mouth closes, and the air rushes out with a hissing sound, and a smart blow is delivered by the tail with great rapidity<sup>1</sup>. It runs with great alacrity, its body well raised from the ground. From the strong character of its claws, more especially those on its fore feet, it is evidently addicted to burrowing, but whether it makes its own burrows or merely inhabits those made by other animals is not known; indeed we possess very little reliable information regarding the habits of the two species of this genus found in Egypt, in their wild state. Pococke<sup>2</sup> says it frequents caverns, where it sleeps during the winter.

This species is distributed over the Northern Sahara from Western Algeria to Egypt, and southwards along the Nile valley to Sennaar, and throughout the Eastern Sudan to the shores of the Red Sea. It is found in Southern Syria, apparently throughout Persia (Caspian Province), Afghanistan, and N.W. India.

It is known to the Arabs as the *waral* of the land or of the desert, *ورل الارض* = *waral el ard*, and *ورل الجبل*, = *waral el jibál*.

Sonnini is responsible for the statement that this lizard is represented on the monuments, but he does not record on what monuments he had observed it. I have not met with any figures of it myself, but it is quite possible that it may occur in some of the scenes depicted on the tomb of Tih.

The Egyptians did not regard it as a sacred animal, although they may have held it in high respect in consequence of its reputation as a destroyer of the eggs of the crocodile.

Herodotus<sup>3</sup>, in his account of the animals of Libya, mentioned a lizard which he called the "crocodile of the land." Prospero Alpini<sup>4</sup> speaks of the "scincus or land crocodile"; but he says that the *Scincus* of his day was not the lizard of that name described by the ancients, which was probably this species, *V. griseus*, a cubit long, like a crocodile, with slightly rounded scales, lighter in colour, and with a thinner skin. Cuvier after much research arrived at the same opinion. Maillet also says there is a species which strongly resembles the crocodile; it is what the ancients called "*Crocodile de terre*, dont la chair des reins est si renommée dans l'Empire de Vénus"<sup>5</sup>.

We are indebted to Abd-Allatif<sup>6</sup> (1161-1231 A.D.) for the native name of this lizard. He says: "On pourroit dire que le crocodile est le waral aquatique; et le waral, le crocodile de terre"; and he adds, "le waral habite les montagnes," that is the desert. Along with his account of the waral he also describes the scink, which he says "est

<sup>1</sup> Zool. Garten, xxxvi. 1895, p. 298.

<sup>2</sup> Bk. iv. cap. 192.

<sup>3</sup> *Op. cit.* p. 36\*.

<sup>4</sup> *L. c.*

<sup>5</sup> *Op. cit.* Lib. iv. cap. 5, pp. 215-216.

<sup>6</sup> Relation de l'Égypte, transl. by S. de Sacy, 1810, p. 142.

une espèce de *waral*, ou plutôt c'est le *waral* lui-même, si ce n'est qu'il a la queue courte"; and goes on to say "il faut regarder le scinque comme constituant une espèce particulière," because, among other reasons, it differed from the *waral* in the places it inhabited, as it lived in the desert plains and in the water, and was found in the Nile. The aquatic habit attributed by Abd-Allatif to the scink suggests the next species, *V. niloticus*; but as he says that whereas the back of the *waral* is scaly and hard, that of the scink, on the contrary, is smooth and soft to the touch, he could hardly have had that species in view, more especially as he describes the scink as yellow and black. His description of the back and colour of the lizard suggests *Scincus officinalis*, and it is just possible that the aquatic habit attributed to the scink, which is as old as the days of Pliny (if *V. niloticus* was not the true scink), may have been suggested by the strongly-fringed digits of *S. officinalis*, which, at the present day, is known as the fish of the sand.

The circumstance that the Greek historian speaks of this large land lizard as the terrestrial crocodile, may probably have originated from the existence in his day of the fable believed in by Abd-Allatif, and still current among the Arabs, that it is produced from the eggs of the crocodile. The belief was that the young when excluded from the egg either betook themselves to the Nile or to land, the former becoming crocodiles and the latter *warals*.

This species is occasionally seen in the possession of conjurers, as it is supposed to be under the influence of music; but these men take the cruel precaution to break off its teeth to prevent it biting, as it is of a fierce disposition.

The natives, according to Sonnini, say that it sucks the milk from sheep and goats; but this is not the only lizard to which this fable is attached, as *Scincus schneideri*, likewise, is known as the milker of sheep. A similar habit is ascribed by the natives of India to the common snake *Zamenis mucosus*, which is said to suck cows. This lizard is also reported when bitten by a snake to search for a particular plant, which it eats as an antidote to the poison.

## VARANUS OCELLATUS, Heyden. (Plate XVII.)

- Varanus ocellatus*, Heyden, Rüppell's Atlas nördl. Afr. 1827, pp. 21-24, pl. 6; Lefebvre, Abyss. Zool. vi. 1845-50, p. 197; Peters, Mon. Berl. Ak. 1862, p. 271; Blanford, Abyss. 1870, p. 445; Gasco, Viagg. Egitto, pt. ii. 1876, p. 106; Blgr. Cat. Liz. B. M. ii. 1885, p. 308; Ann. Mus. Civ. Genova, ser. 2, xvi. (xxxvi.) 1896, p. 550; op. cit. ser. 2, xvii. (xxxvii.) 1896, p. 17, 1897, p. 278; Proc. Zool. Soc. 1895, p. 534; op. cit. 1896, p. 215; Boettger, Kat. Rept. Mus. Senck. 1893, p. 69; Tornier, Thierm. O.-Afr. Rept. 1896, p. 38.
- Monitor ocellatus*, part., Gray, Syn. Griffith's An. King. ix. 1831, p. 25; Rüppell, Mus. Senck. iii. 1845, p. 301; Peters, Mon. Berl. Ak. 1870, p. 109.
- Empagusia ocellata*, part., Gray, Ann. & Mag. N. H. i. 1838, p. 393.
- Varanus albigularis*, Boettger, Zool. Anz. 1893, pp. 115, 132.
- Varanus microstictus*, Boettger, Kat. Rept. Mus. Senck. 1893, p. 72.

Teeth stout, conical. Snout depressed at its tip; canthus rostralis rounded; nostril oblique, rather large, twice as far from the end of the snout as from the eye. Tail more or less rounded at the base, posteriorly compressed, with a double-edged dorsal ridge, slightly shorter or longer than the body and head. Digits short and stout. Scales on the head rather large, markedly so on the forehead, smallest on the supra-ocular region. Scales in 90-95 rows across the middle of the body, large, flat, smooth, elongately oval, rounded or pear-shaped, largest on the neck, where they are larger than the scales on the forehead. Skin of body thrown into marked transverse and oblique furrows. Ventrals large, smooth, 68 to 75 transverse rows from the collar to the inguinal fold. Caudal scales more or less keeled, more especially on the dorsal surface, in 102-124 verticils.

In life, according to Heyden, the whole upper surface is brownish grey. Six, seldom eight, large, oval, clear spots on the back, each margined with a dark ring, 13 or 14 in each longitudinal row, and each spot enclosing about four scales. Upper surface of the tail more or less banded with brown. The under surface greyish yellow. The sides of the belly marked with the beginning of dark bands, which become stronger above. Eyes reddish yellow; pupil black.

In an adult from Anseba valley, the yellow spots are obscurely indicated and the general colour of the upper surface is yellowish brown marked with blackish spots, the dark bands on the sides of the belly feebly marked. A broad brown band, the breadth of the temporal area, is prolonged backwards along the side of the neck to the shoulder, and obscurely on to the fore limb, and another but narrow similarly coloured band runs from the upper margin of the ear backwards, separated from the former by a yellowish interspace. Under surface rather rich gamboge-yellow.

The band that passes on to the limb seems to be the equivalent of the well-defined band of *V. albigularis* that bends abruptly forwards on to the pectoral area.

Snout to vent 375 millim.; tail 367 millim.





VARANUS OCELLATUS.  
♂ Anseba Valley, Abyssinia.





This is a terrestrial lizard with the habits of *V. griseus*, and, according to Heyden, it burrows and lives on other lizards and beetles.

Mr. Blanford obtained his specimen under a rock, in rather open ground, in the Anseba valley.

It is known only from Kordofan and Abyssinia.

Heyden founded the species on a specimen obtained by Rüppell at Kordofan, and, according to Prof. Boettger, it was presented to the Frankfort Museum in 1827. In the following year a *Varanus* from Abyssinia was also presented by Dr. Rüppell. Dr. J. E. Gray, in his Synopsis of Reptiles in Griffith's 'Animal Kingdom,' gave a list of the species of *Varanidæ* he had noted in the different museums of Europe, and among them he enumerates *Monitor ocellatus*, Heyden, as existing in the Frankfort Museum; but, strange to say, he does not mention Kordofan as the locality of the species, but adds to his short diagnosis of it "Dongola, Senegal. Mus. Rüppell." No specimen from Dongola, on the Nile, appears either in Rüppell's or in Prof. Boettger's Catalogues of the Reptilia in the Frankfort Museum. Is it possible that the Abyssinian *Varanus* presented, in 1828, by Rüppell may have come from the Dongola in Abyssinia, mentioned by Mr. Blanford, and that the specimen may have once borne a label to that effect? What is certain is that *V. ocellatus* was from Kordofan, and that no specimen of the species has ever been recorded from Senegal.

Gray, in 1838, referred *V. ocellatus* to his genus *Empagusia*, which he characterized as follows:—"Nostrils oblong, rather in the front of the muzzle. Tail (shorter than the body and head) tapering, roundish, with a double-edged keel above; toes short, strong, subequal; teeth rounded; scales larger." When he wrote, *V. albigularis*, Daud., and *V. exanthematicus*, Bosc, were unrepresented in the Frankfort Museum, as neither of them appeared in Rüppell's Catalogue, and, moreover, Professor Boettger states that the only specimen of the former in the Museum was received in 1893, and that of the latter in 1881. The position of the nostril assigned to *Empagusia* is in no way applicable to the nostril of *V. ocellatus*, but applies to that of *V. exanthematicus*; and it is probable that this may account for Gray having given Senegal as a locality for his *V. ocellatus*, which was not the species described under that name by Heyden.

Rüppell, when he catalogued the specimens in the Frankfort Museum, regarded the Abyssinian *Varanus* as distinct from *V. ocellatus*, and named it *V. microstictus*, but did not describe it.

On a visit to the Frankfort Museum some years ago, I wrote out the following description of the specimen:—"Scales on the upper surface of the neck much larger than on any other part of the body, the largest measuring fully 3 millim. in transverse diameter, and even 4 millim. in length. They are much larger than the scales on the occiput, the scales on the head generally being even less than half the size of the nuchal scales, but the flat tessellated scales on the middle of the head between the eyes are large. The scales on the middle of the back are somewhat smaller than those

external to them, and there are from 3 to 6 such rows. The distance between the lower anterior border of the nostril to the end of the snout equals the distance between the former point and the posterior angle of the eye. Canthus rostralis, sharp and well defined, and the top of the head from the posterior border of the orbit forwards elongately triangular. The anterior border of the eye to the snout equals the distance between the aforementioned point and the upper border of the ear. The third finger is longer than the fourth, the reverse of what occurs in *V. griseus*, but the same as prevails in *V. ocellatus*. Seventy to seventy-five transverse rows of scales. Tail round at the base, but the remainder more or less compressed, with a double-edged dorsal ridge. The colour is uniform olive-yellow above, with some yellow spots on the back, somewhat transverse in position, but obscure."

This specimen has been fully described by Prof. Boettger in his Catalogue; but I am indebted to him for some further particulars regarding the types of *V. ocellatus* and *V. microstictus*.

In the British Museum there is a *Varanus* from Kordofan presented by Dr. Rüppell, besides the specimen from the Anseba valley, Abyssinia, obtained by Mr. Blanford. These two lizards are unquestionably specifically identical. The first is a stuffed specimen, whilst the latter is preserved in alcohol. Both have exactly the same kind of scales. Those on the forehead and front of the snout are large, and the scales on the back of the neck are considerably larger than any of the other scales of the body. The ventrals are large. The digits are short and stout. The tail is compressed, with a double-edged dorsal ridge. In the case of the stuffed Kordofan specimen the nostril is a little nearer the end of the snout than in the Abyssinian specimen in alcohol, but this is due to the shrivelling up of the fleshy end of the snout. In the latter the nostril is about twice as distant from the end of the snout as it is from the eye, and in the former about  $1\frac{1}{2}$  times. This is the only point in which they are not perfectly alike, but I believe it to be satisfactorily explained by the difference in the methods of their preservation. Both conform to Heyden's description of *V. ocellatus* and to Prof. Boettger's account of *V. microstictus*.

#### VARANUS NILOTICUS, Hasselq. & Linn. (Plate XVIII.)

*Le Monitor du Nil ou Ouaran*, Cuv. Règ. An. ii. 1817, p. 25.

*Le Monitor du Congo*, Cuv. l. c. p. 25.

*Lacerta nilotica*, Hasselq. & Linn. Iter Palæst. 1757, p. 311; Linn. Syst. Nat. i. 1766, p. 369; Forskål, Deser. An. 1775, p. 13.

*Lacerta capensis*, Sparrmann, Resa Goda Hop. 1783, p. 749.

*Scincus niloticus*, Schn. Hist. Amph. ii. 1801, p. 195.

*Tupinambis elegans*, part., Daud. Rept. iii. 1803, p. 36.

*Tupinambis stellatus*, Daud. l. c. p. 59, pl. xxxi.

*Tupinambis niloticus*, part., Daud. l. c. p. 51; Is. Geoff. St.-Hil. Deser. de l'Égypte, Hist. Nat. ? 1827, p. 121, pl. 8. fig. 1.



VARANUS NILOTICUS.

♂, Luxor.





*Tupinambis ornatus*, Daud. Ann. Mus. ii. 1803, p. 240, pl. xlvi.

*Monitor pulcher*, Leach, Bowdich's Mission to Ashantee, 1819, p. 493; Griffith's An. King. ix. 1831, p. 203, plate.

*Varanus elegans, part.*, Merr. Tent. Syst. Amph. 1820, p. 58.

*Varanus ornatus*, Merr. l. c. p. 59.

*Polydædalus niloticus*, Wagler, Syst. Amph. 1830, p. 164.

*Polydædalus capensis*, Wagler, l. c. p. 165.

*Monitor ornatus*, Gray, Syn. Griffith's An. King. ix. 1831, p. 27.

*Varanus niloticus*, Dum. & Bibr. iii. 1836, p. 476; Wiegman. Arch. f. Nat. 1837, ii. p. 228; A. Dum. Cat. Rept. Paris Mus. 1851, p. 50; Peters, Mon. Berl. Ak. 1862, p. 271; Steindach. Sitzb. Ak. Wien, lxii. 1, 1870, p. 330; Gasco, Viagg. Egitto, pt. ii. 1876, p. 106; Blgr. Cat. Rept. B. M. ii. 1885, p. 317; Ann. Mus. Civ. Genova, ser. 2, xvii. (xxxvii.) 1896, p. 17; id. op. cit. 1897, p. 277; Mocquard, Cent. Soc. Philomathique, 1888, p. 115\*; Anderson, Herpet. Arabia & Egypt, 1896, p. 101; Boettger, Kat. Rept. Mus. Senck. 1893, p. 71.

*Varanus copensis*, Wiegman. Arch. f. Nat. 1837, ii. p. 228.

*Monitor niloticus*, Licht. Doubl. Berl. Mus. 1823, p. 107; Gray, Ann. Mag. N. H. i. 1838, p. 393; Cat. Liz. B. M. 1845, p. 11; Duvernoy, Rept. Cuv. Règ. An. 1836-46, pl. x. bis fig. 1; Lefebvre, Voy. Abyss. iv. 1845-50, p. 196; Rüppell, Mus. Senck. iii. 1845, p. 301; Matschie, Zool. Jahrb. v. 1891, Abth. f. Syst. p. 612; Günther, Proc. Zool. Soc. 1894, p. 87; Ann. & Mag. N. H. (6) xvii. 1896, p. 264.

*Monitor elegans*, Schleg. Abbild. 1837-44, p. 75.

*Monitor saurus*, Peters, Mon. Berl. Ak. 1870, p. 109.

*Varanus saurus*, Stejneger, Smithsonian Inst. no. 970, 1893, p. 717.

2 ♂ juv. Luxor.

Anterior teeth small, sharply pointed, those behind them rather large and conical. Snout depressed at its extremity; canthus rostralis well defined. Nostril small, round, situated nearly midway between the end of the snout and the eye, but nearer to the latter than to the former. Tail much compressed, with a well-defined dorsal ridge. Digits moderately long. Scales on the upper surface of the head of moderate size, smallest on the temporal region and subequal on the supraocular region. Scales on the body and limbs small, oval, or pear-shaped; caudal scales keeled; ventrals smooth, 75 to 100 between the gular and ungual folds.

In the young and even in the half-grown the body is blackish above. The upper surface of the head with fine wavy transverse yellowish lines, and the sides, from the snout to the ear, marked by vertical black spots or bars broken up with yellowish. A pale yellow band from the eye to the ear, with a black band above it directed backwards to the mesial line of the neck, where it joins with its fellow of the opposite side, and a number of similar bands behind it with intervening pale yellow lines forming V-shaped markings. Eight narrow, yellow, transverse bands across the back, always more or less broken up with black and resolved in some on the sides into yellowish spots or ocelli with black centres, and prolonged on to the sides of the tail, where other larger but similar spots appear below and above them, the combined spots being

arranged in transverse series with dark interspaces; black bands pass down to the belly from the sides and meet on the mesial line below, and similar lines occur on the under surface of the neck and on the limbs, the yellowish intervening areas having many black spots. The upper surface of the limbs black, with yellowish spots, as on the sides. General colour of the under surface yellowish. In the adult the markings of the young become very obscure. The general colour is olive brownish above with dark reticulations, the yellow spots of the body and limbs and the dark markings of the belly and limbs being more or less present.

It attains to 170 centimetres or more in length. Although more or less aquatic in its habits it is frequently seen hunting for its food along the banks of the Nile, and is met with in the irrigated fields, but never in the desert. It is carnivorous in its habits, and is said to live largely on fish, to pursue the young of the crocodile, and also to eat the eggs of that animal. Little reliable information, however, has yet been placed on record regarding the habits of this lizard. From the strongly carnivorous instinct which it manifests in confinement, eating rats and mice with avidity, it probably preys on the field-rat, *Isomys*, the burrows of which are so plentiful along the banks of the river and canals, and may likewise devour such lizards as *Mabuia quinqueteniata* and *Chalcides ocellatus*, which are found in similar situations. When surprised on the banks of the river it at once betakes itself to the water. It appears to be more numerous in Upper than in Lower Egypt. It is distributed throughout Africa, except in the region to the west of the Nile and to the north of the Congo, Niger, and Senegal rivers.

The native name of this lizard is *ورل النهر* = *waral el nahr*, or *waral* of the river.

In this species two slight præanal eminences are occasionally present in both sexes, immediately before the cloacal opening, occupying the position of the præanal pores of the other lizards. They are present in specimens from different parts of Africa, *e. g.* the island of Lagos, Port Elizabeth, Lake Nyassa, Condo (Quanza), Boloma (Senegambia), Lamu (E. Africa), and Ashantiland. The smallest of all the specimens in the British Museum, from the Quanza, is very instructive. The apical pores of the scales anterior to the cloacal opening are larger than in any other part of the body, and one or two are larger than the others immediately around them. These enlarged pores are restricted to the centre of each præanal eminence, but no one is more differentiated than another. On the other hand, in a specimen from Port Elizabeth there is a well-developed pore on each side of the mesial line, with some small pores around it. Much the same condition is occasionally met with in *V. griseus*.



*LATASTIA LONGICAUDATA.*

Fig. 1 ♂, Figs. 2 & 3 ♀, Suakin.



## LACERTIDÆ.

## LATASTIA.

*Latastia*, Bedriaga, Ann. Mus. Civ. Genova, xx. 1884, p. 307.

"Head-shields normal. Nostril pierced between two or three nasals and the first upper labial. Lower eyelid scaly. Collar well marked. Dorsal scales juxtaposed or imbricate; ventral shields quadrangular, feebly imbricate, smooth. Digits sub-cylindrical, with keeled lamellæ inferiorly. Femoral pores. Tail long, cylindrical."—*Boulenger*.

## LATASTIA LONGICAUDATA, Reuss. (Plate XIX.)

*Lacerta longicaudata*, Reuss, Mus. Senck. i. 1834, p. 29.

*Lacerta* (*Acanthodactylus*) *longicaudata*, Rüppell, Mus. Senck. iii. 1845, p. 304.

*Lacerta samharica*, Blauf. Zool. Abyss. 1870, p. 449, fig. head.

*Lacerta sturti*, Blauf. op. cit. p. 452, fig. head.

*Eremias revoili*, Vaill. Miss. Révoil aux Pays Comalis, Rept. 1882, p. 20, pl. iii. fig. 2.

*Latastia doriai*, Bedr. Ann. Mus. Civ. Genova, xx. 1884, p. 313.

*Latastia samharica*, Bedr. l. c. p. 319.

*Latastia longicaudata*, Blgr. Cat. Liz. B. M. iii. 1887, p. 55; Ann. Mus. Civ. Genova, ser. 2, xii. (xxxii.) 1891, p. 7; Ann. & Mag. N. H. (6) xvi. 1895, p. 168; Ann. Mus. Civ. Genova, ser. 2, xvi. (xxxvi.) 1896, p. 551; op. cit. ser. 2, xvii. (xxxvii.) 1896, p. 17; Proc. Zool. Soc. 1896, p. 215; Ann. Mus. Civ. Genova, ser. 2, xvii. (xxxvii.) 1897, p. 278; Mocquard, Mém. Soc. Philom. Cent. 1888, p. 117\*; Boettger, Kat. Rept. Mus. Senck. 1893, p. 89; Günther, Proc. Zool. Soc. 1894, p. 87; Anderson, Herpet. Arabia & Egypt, 1896, p. 102.

4 ♂ and 2 ♀. Suakin, Surgeon-Captain R. H. Penton.

5 ♂ and 2 ♀. Suakin.

1 ♂. Akik, about 80 miles south of Suakin.

1. Tokar, about 50 " " "

3 ♂, 5 ♀, and 2 juv. Durrur, 16 miles north of Suakin. Major-General A. Hunter, D.S.O.

Head rather elongate and pointed; the distance between the anterior angle of the eye to the tip of the snout equals the interval between the posterior angle of the eye and the ear; ear vertical, its height equalling the long diameter of the eye, not denticulated; nostril defined by the first labial, a supranasal, and two postnasals; supranasals form a broad suture behind the rostral; frontonasal broader than long; præfrontal suture almost as long as that of the supranasals; frontal narrow posteriorly and grooved throughout its length; two large supraoculars separated from the præfrontals and parietals by groups of small scales and from the superciliaries by a line of



granules; interparietal much longer than broad, generally in contact with the occipital, but occasionally separated from it by an interposed small shield; occipital small, half the size of the interparietal; parietals large, with a band-like shield along their outer borders, and a small curved shield anterior to and above the ear; temporal scales granular, smooth or feebly keeled; 10 to 13 upper labials, generally the seventh reaches the eye, sometimes the eighth, rarely the sixth or ninth. Chin-shields large, the three pair in contact. Gular scales small, round, and smooth. Collar-plates large, from 8 to 12. Body-scales small, granular, increasing in size behind the shoulder, juxtaposed, obtusely keeled, and in transverse series; 53 to 68 scales round the middle of the back, not counting the ventrals; the latter in 6 transverse and in 27 to 33 longitudinal series from the collar to the præanal region, the two central rows the narrowest. A single large præanal plate in the male, absent in the female. Outside of the fore limb covered with a line of large broad scutes; the front of the thigh and the under surface of the labial portion of the limb with similar plates. The fore limb reaches to the anterior angle of the eye and even to the nostril, and the hind limb to the collar or to near the ear. 10 to 13 femoral pores on each side. Tail broader than deep at the base, especially in the male, variable in length, more than twice, sometimes more than thrice, as long as the body and head; upper caudal scales strongly keeled, smooth below.

Olive-brown above, head-shields variegated with reddish brown. A rich dark-brown narrow vertebral line from the occiput to the base of the tail, and three rich reddish, longitudinal, but more or less interrupted bands external to it, marked at intervals with brown spots and forming vertical brownish bars on the sides of the body and neck, enclosing bluish and yellow interspaces, which assume the form of ocelli. Sides of the head also more or less marked with vertical bars, and likewise the upper labials. Sides of the tail yellowish, with a dusky longitudinal band. Under surface white. Males much more brilliantly coloured than the females.

Abnormal conditions sometimes exist in the formation of the nostril. Thus in one specimen it is defined on the right side of the head by an anterior nasal, the supranasal, two postnasals, and the second labial, and on the left side by the first labial, two postnasals, and the supranasal. On both sides of the head there is a small shield between the superior postnasal and the frontonasal and in contact with the anterior loreal, præfrontal, and supranasal. On the left side a small shield lies below the supplementary shield. In this specimen also there is a further departure from the usual condition of the head-shields, as there is a small shield on either side of the hinder end of the interparietal: moreover, it is the only individual in which the ninth labial is the subocular—a condition brought about by the formation of an additional labial by lateral partition of the rostral. In another specimen, by the formation of an additional anterior nasal at the expense of the supranasal, the nostril is defined by five shields.

The largest male from the Suakin and Tokar district measured 110 millim. from snout to vent, and the largest female 106 millim.

This species has the habits of an *Eremias*, and is found among the sparse grassy vegetation of the littoral plain at Durrur, Suakin, Tokar, and Akik, in much the same conditions that *L. neumanni*, Matschie, is found on the plain at Lahej, on the opposite coast, in the neighbourhood of Aden.

It has been recorded by Mr. Blanford from the littoral plain at Annesley Bay, and by Mr. Boulenger from the island of Dissei, at the mouth of the Bay. Since Professor Vaillant's and M. Mocquard's record of its occurrence in Somaliland, the collections of reptiles made of recent years in Abyssinia, Shoa, Western and Southern Somaliland, and British East Africa, by various explorers, further prove it to have a wide distribution over the eastern promontory of the continent, as it has been found between Obbia and Berbera, near Berbera, to the west of the Juba river, and at Fuladoya, near Mount Kenia; also at Nguruman, and between Kilima-njaro and Lake Victoria Nyanza, by Mr. Oscar Neumann. It thus ranges in Africa from about 20° N. lat. to 4° S. of the Equator; but as the littoral plain of the Red Sea extends a long way beyond Durrur, it has probably a considerably more extended range to the north than is at present assigned to it. The types of this species are stated by Reuss to have been obtained by Rüppell, at Tor, in the Sinaitic Peninsula, and when he described them he had others before him collected by Rüppell in Abyssinia. It has never been recorded from Asia since Reuss's day.

The ventrals are wonderfully uniform in all of the specimens from the Suakin district, as six are invariably present across the middle of the belly; but variation exists in the number of ventrals between the collar and the præanal region, although not to any extent, as the lowest number recorded is 27 and the highest 33. The dorsal scales across the middle of the body vary from 54 to 68, and the collar-plates range from 8 to 14. In a young specimen from Suakin there are only 9—9 upper labials; but the intermediate numbers up to 13 are met with. Although the number of upper labials may be symmetrical on both sides of the head, it does not follow that the same shield is the subocular on the right and left of the head, as in 12 out of 23 specimens asymmetry prevails. In one specimen it is the 5th and the 6th, in another the 6th and 7th, in nine the 7th and 8th, and in one the 8th and 9th. Among these Suakin lizards there are never fewer than 10 femoral pores on each limb, but in two 13 occur asymmetrically associated either with 11 or 12, while in three 13 are present symmetrically.

Two females obtained by Mr. Oscar Neumann at Nguruman and one of the same sex from El Jeckar, the most southern known localities of its distribution, differ only slightly in their coloration from the Suakin lizards. The back is marked by longitudinal lines of brown spots, and the dark mesial line is very little, if at all, more defined than those external to it.

Besides *L. neumanni* (Matschie)<sup>1</sup> from Arabia, other species are known; but one of them, *L. bosca*, Bedriaga<sup>2</sup>, is doubtfully distinct from the present species. *L. carinata*, Peters<sup>3</sup>, *L. spinalis*, Peters<sup>4</sup>, and *L. hardeggeri*, Steind.<sup>5</sup>, are found in the same region of Eastern Africa.

<sup>1</sup> S.B. Ges. naturf. Fr. Berlin, 1893, p. 30; Proc. Zool. Soc. 1895, p. 643.

<sup>2</sup> Ann. Mus. Genova, xx. 1884, p. 322.

<sup>3</sup> Mon. Berl. Ak. 1874, p. 368, pl. fig. 1.

<sup>4</sup> Mon. Berl. Ak. 1874, p. 369, pl. fig. 2.

<sup>5</sup> Ann. Hofmus. Wien, vi. 1891, p. 371, pl. xi. The *L. heterolepis*, Boettger, Zool. Anz. xvi. 1893, p. 115, from Somaliland, is identical with *L. hardeggeri*, Steind.

ACANTHODACTYLUS<sup>1</sup>.

*Acanthodactylus*, Wiegman. Herpet. Mex. pt. i. 1834, p. 10.

Nostril defined by the first labial and two nasals. Collar more or less present. No occipital shield. Digits with a strong lateral fringe and keeled plates below. Lower eyelid scaly. Dorsal scales rhomboidal, more or less carinate, imbricate or non-imbricate. Ventrals quadrangular, smooth, feebly imbricate. Tail more or less cylindrical. Femoral pores present.

As pointed out by M. Lataste, *A. scutellatus* and *A. cantoris* are distinguished from all the other species by the presence of four well-defined rows of scales around the fingers, viz. a dorsal, a ventral, and two lateral rows, one to each side of a digit. The interno-lateral row is never fully developed in the other species, but I have observed the presence of a few small straggling scales occupying its position in *vulgaris*, *micropholis*, *boskianus*, *schreiberi*, and *pardalis*.

In all the species of the genus there are only three rows of scales around the toes, viz. a dorsal, ventral, and one externo-lateral. It is this last row, composed of more or less sickle-shaped scales of varying strength, that constitutes the fringe; but the inner distal angle of each dorsal scale may be so developed as to constitute a denticulation, but never a true fringe.

<sup>1</sup> It has been stated by Professor Gasco that two examples of *Lacerta ocellata*, Daud., were obtained by him near Alexandria. He referred them to a variety which he called *lepida*. It seems highly improbable, however, that *Lacerta ocellata* occurs in Egypt, and as Gasco did not distinguish between *Eremias guttulata*, Licht., and *E. rubropunctata*, Licht., it is just possible that he may have mistaken an ocellated specimen of the former for *L. ocellata*, Daud. Of course this is only guesswork; but so unlikely is it that the last-mentioned species should be found at Alexandria, that I feel compelled to suggest some explanation of how the error may have arisen.

He also records *Psammotromus algirus*, Linn., and says "this species, which abounds in Algeria and Spain, was collected by us only in the neighbourhood of Alexandria." My impression is that in this case also we have an error of identification, and that Gasco had probably before him some species of *Acanthodactylus*.

Professor Vaillant, in Révoil's 'Mission to Somaliland,' mentions the occurrence of *Tropidosauria algira* = *P. algirus* at a place called Darror. Through Professor Vaillant's kind permission I have been enabled to compare Révoil's specimen with one from Algeria, with which it fully agrees. The presence of *P. algirus* in Somaliland, if it really occurs there, is a very remarkable fact in distribution. It is noteworthy, however, that it has never been present in any other collection from Somaliland.

## ACANTHODACTYLUS BOSKIANUS, Daud. (Plate XX.)

*Lacerta boskiana*, Daud. Rept. iii. 1803, p. 188, pl. xxxvi. fig. 2; Licht. Doubl. Berl. Mus. 1823, p. 100; Aud. Descr. de l'Égypte, Hist. Nat. i. ? 1829, p. 173, Suppl. pl. i. figs. 91 & 92.

*Lacerta aspera*, Aud. op. cit. p. 174, Suppl. pl. i. fig. 10.

*Acanthodactylus boskianus*, Wieg. Herp. Mex. 1834, pt. i. p. 10; Dum. & Bibr. v. 1839, p. 278; Gray, Cat. Liz. B. M. 1845, p. 38; Gervais, Ann. Sc. Nat. (3) x. 1848, p. 204; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 38; Peters, Mon. Berl. Ak. 1862, p. 271; op. cit. 1880, p. 308; Blandford, Zool. Abyss. 1870, p. 456; Gasco, Viagg. in Egitto, pt. ii. 1876, p. 107; Boulenger, Bull. Soc. Zool. France, 1878, p. 182; Proc. Zool. Soc. 1881, p. 744, pl. lxiv. fig. 2; Cat. Liz. B. M. iii. 1887, p. 59; Trans. Zool. Soc. xiii. 1891, p. 129; Ann. Mus. Civ. Genova, ser. 2, xvi. (xxxvi.) 1896, p. 551; Klunzinger, Zeitschr. Ges. f. Erdk. Berl. xiii. 1878, p. 93; Eimer, Arch. f. Nat. 1881, p. 406, pl. xv. fig. 26; Boettger, *part.*, Ber. Senck. nat. Ges. 1879-80, p. 182; Kat. Rept. Mus. Senck. 1893, p. 89; Reichenow, Sitz.-Bericht Ges. naturf. Fr. Berl. 1883, p. 149; Lataste, *part.*, Ann. Mus. Civ. Genova, ser. 2, ii. (xxii.) 1885, p. 496; Parenti e Picaglia, Rett. ed Anfibi Mar Rosso, 1886, p. 29; Pfeffer, Jahrb. Hamb. Wissensch. Anst. vi. 1889, p. 6; Hart, Fauna & Flora of Sinai, &c. 1891, p. 210; Anderson, Proc. Zool. Soc. 1892, p. 14; op. cit. 1895, p. 645; Herpet. Arabia & Egypt, 1896, p. 34 et p. 102; König, Verh. (S.B.) nat. Ver. Bonn, 1892, p. 18; Matschie, Ges. nat. Fr. Berl. 1893, p. 30; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 111; Peracca, Boll. Mus. Torino, no. 167, ix. 1894, p. 7; Werner, Verh. zool.-bot. Ges. Wien, xliii. 1894, p. 359; op. cit. xlv. 1895, p. 82.

*Scapteira inæqualis*, Gray, Ann. & Mag. N. H. i. 1838, p. 280.

*Acanthodactylus boschianus*, Bonap. Icon. Fauna Ital. 1832-42.

*Lacerta (Acanthodactylus) boskiana*, Rüppell, Mus. Senck. iii. 1843, p. 304.

8 ♂ and 5 ♀. Banks of Freshwater Canal, Suez.

4 ♂ and 1 ♀. Abukir.

6 ♂ and 5 ♀. Ramleh.

17 ♂ and 9 ♀. Alexandria (suburbs).

1 ♀. Maryut District.

3 ♂ and 1 ♀. Cairo suburbs. Dr. Walter Innes.

1 ♂. Plain of Kafr Gamus.

13 ♂, 12 ♀, and 2 juv. Margin of desert, Gizeh Pyramids.

9 ♂ and 12 ♀. Plain of Tel el Amarna. Prof. W. Flinders Petrie, D.C.L.

8 ♂, 4 ♀, and 1 juv. Margin of desert, Luxor.

1 ♀. Oasis of Dâkheil. Major H. S. Lyons, R.E.

6 ♂ and 3 ♀. Assuan.

1 juv. ♀. Suakin. Colonel Sir Charles Holled Smith, C.B., K.C.M.G.

3 ♂, 1 ♀, and 1 juv. Suakin. Surgeon-Captain R. H. Penton.

11 ♂ and 11 ♀. Plain of Suakin.

1 juv. Tokar.

Snout short, obtusely pointed, more so in some than in others. Four supraoculars separated from the superciliaries by one line of granules; first and fourth entire, or broken up either into separate pieces or into granules. Subocular broadly excluded





ACANTHODACTYLUS BOSKIANUS.

Figs. 1 & 2 ♂, Soudan; Fig. 3 ♀, Alexandria; Fig. 4 juv., Gizeh.



from the labial margin by the fourth and fifth, and occasionally by the fifth and sixth labials. Ear denticulated in a varying degree. Temporal scales more or less elongate, in some examples obtusely keeled, in others smooth and conical. Dorsal scales small from the occiput to the shoulder, rhomboidal, imbricate, carinate, increasing in size at the shoulder, very much larger on the hinder part of the back, where they pass into the large scales on the base of the tail; 8 to 16 rows between the thighs. Thirty-five to 58<sup>1</sup> rows of scales round the middle of the body; ten rows of ventral plates, exceptionally twelve, broader than long, and in longitudinal and transverse series. Usually a preanal plate with two or three smaller plates anterior to it, and also laterally, but sometimes all are more or less broken up. Limbs well developed, variable, the hind limb may reach as far as the eye or only to the shoulder. Digits on the fore and hind limbs covered with three rows of plates, viz. a dorsal, ventral, and externo-lateral, the latter forming a denticulated border stronger in some than in others, but always more developed on the outer edge of the toes, but shorter than their diameter. Tail generally more than twice the length of the body and head, covered above with strongly keeled scales, those on its under surface, at the base, being smooth or feebly keeled.

The femoral pores vary from 15 to 32.

The young has generally six narrow, white, longitudinal lines along the back and sides, arising from behind the ear and occiput, and separated from each other by five broad blackish bands; another similarly coloured band runs along the lower border of each of the outermost white bands. The black bands are generally more or less spotted with white, and are prolonged on to the tail. Occasionally a seventh white band is present along the mesial line of the back. The upper surface of the head is uniform brownish or even bluish grey, the sides being more or less spotted with brown. Underparts white. Three longitudinal lines or bands may persist in a varying degree into the adult stage, but generally they become obscure and the dark bands are broken up into longitudinal lines, or areas of alternate black and white or somewhat rufous or grey spots, the white lines being only feebly indicated. In many the bands and lineation all but disappear. Tail of half-grown specimens generally coral-red in its latter two-thirds.

The largest male I have met with in Egypt (Abukir) measures 79 millim. from the snout to the vent, and the tail 163 millim.; but it attains to a greater size, for the corresponding measurements of an individual of the same sex from the Hadramut are 86 millim. and 190 millim. respectively.

This species is common along the margin of the desert among stones and loose soil and sparse vegetation, and also on the embankments of canals and roadways. It is very plentiful along the banks of the Freshwater Canal at Suez, which are fringed in many places with long grass growing in the water, and amid the stems of which the lizard runs for shelter when pursued, clinging on to them in the water. It is also

<sup>1</sup> Lataste counted 52 rows of scales round the middle of the body.

common on the waste land and along the roadways immediately within and without the ramparts of Alexandria, and, indeed, along the entire surface of the delta from Port Said to the Maryut District, wherever there may be gravel and a few plants. It is found in suitable localities as far as Wádí Halfa, and probably much further to the south.

It lives chiefly on small beetles and flies. Its keen sight and the wonderful rapidity of movement which characterize it and all the members of this genus, as well as those of the genus *Eremias*, render it most expert in capturing its prey.

Gravid females of this genus, in the months of January and April, had generally two mature eggs in each oviduct.

It is known to the Arabs as سَحْلِيَّة = *sihliya*, or lizard, a term applied by them also to the members of the genera *Eremias*, *Mabuia*, and *Chalcides*.

In order to ascertain the character of the lepidosis throughout Egypt and the surrounding area in which this lizard is found, I have counted the scales in 269 specimens.

The typical form of this species, as distinguished from var. *aspera*, is confined to the sea-face of the delta—that is to say, the lizards of that area are generally characterized by more numerous scales than are to be found in other parts of Egypt. At Assuan, Luxor, Tel el Amarna, Gizeh, in the Cairo district, Suez, the Eastern Sudan, the Sinaitic Peninsula, and Arabia the scales fall to a lower number than in the deltaic lizards, as in the latter the scales start nearly from the maxima of the former and rise almost to 58. The highest number found in var. *aspera* in the Nile valley proper is 48, whereas the maximum of 51 occurs in only a single specimen among 33 from Suakin. Although high numbers are occasionally reached in var. *aspera*, they are as a rule exceptional. At Assuan, in 8 out of 10 specimens starting at 38, the highest number is 44, but in the remaining two it is 47. Much the same condition is present in the other localities—*e. g.*, at Tel el Amarna the highest prevailing number in 29 specimens is 43, as only in 4 out of the 29 do higher numbers occur. At Gizeh, which yields the most representative examples of var. *aspera*, the number 43 is not exceeded in 33 specimens. On the other hand, at Abukir, no lizard is represented with fewer scales than 51; but, although the scales may fall at Ramleh to 48, only 5 out of 13 have fewer scales than 50. In the same way at Alexandria the number may be as low as 46; but out of 28 specimens 16 have more than 50 scales, the numbers rising to 58. On the western frontier of Tripoli (Duirat) the coarse form of lepidosis prevails, but specimens with 51 scales may be exceptionally met with. In Tunisia, Central Algeria, and in the Algerian Sahara the low numbers distinctive of var. *aspera* prevail. The same also is true of the Sinaitic Peninsula, Southern Syria (Dead Sea), and especially of Aden and Hadramut, Arabia, the Eastern Sudan, and the coast-line of Abyssinia (Annesley Bay).

I have never experienced any difficulty, except in a limited number of cases, in separating out these Egyptian lizards to their respective groups by the eye alone, without

counting the scales, but the existence of these exceptions links the variety with the typical form. The high lepidosis sometimes met with in forms distinctly referable to var. *aspera* appears to be brought about by the multiplication of the small lateral scales as distinguished from the truly dorsal scales. Division of the first and fourth supraoculars is of most frequent occurrence in the numerously scaled typical form, and it is in it also that the greatest number of femoral pores occurs. In examples of var. *aspera* with from 36 to 38 rows of scales there are from 17 to 20 femoral pores, whereas in the deltaic lizards with 49 scales and upwards, 20 to 32 femoral pores may be present.

These lizards from the delta approach *A. syriacus* in the character of the body-scales, but, unlike it, the first supraocular is completely broken up, and the fourth is subdivided, and, moreover, their scales are much less numerous and the posterior dorsals are more enlarged. *A. boskianus* is also nearly allied to *A. cantoris* of Arabia and of the region to the north-east.

Outside Egypt and the Egyptian Sudan, this species is distributed to the west as far as the frontier of Morocco, and, in Algeria, it is found in the Tell and on the plateau, at elevations over 3000 feet above the sea. It is also present in the Algerian Sahara, *e. g.* at Biskra 360 feet, and at El Aghouat 2437 feet above the level of the sea. It extends northwards from Egypt into Southern Syria, and to the east into the Sinaitic Peninsula and Arabia.

#### ACANTHODACTYLUS PARDALIS, Licht. (Plate XXI.)

*Lacerta pardalis*, Licht. Doubl. Mus. Berl. 1823, p. 99.

*Lacerta savignyi*, M.-Edw. Ann. Sc. Nat. xvi. 1829, pp. 73, 85, pl. vi. fig. 4.

*Acanthodactylus savignyi*, *part.*, Dum. & Bibr. v. 1839, p. 273; Gray, Cat. Liz. B. M. 1845, p. 37; Gervais, Ann. Sc. Nat. (3) x. 1848, p. 204; Guichenot, Explor. Alg., Sc. Phys. Zool. v. 1850, p. 14; *part.*, A. Dum. Cat. Rept. Paris Mus. 1851, p. 128; Licht. Nomenc. Rept. Mus. Berl. 1856, p. 15; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 36; Gasco, Viagg. in Egitto, pt. ii. 1876, p. 108; *part.*, Boettger, Bericht Senck. nat. Ges. 1879-80, p. 178; Blgr. Proc. Zool. Soc. 1881, p. 744; Cat. Liz. B. M. iii. 1887, p. 63; *part.*, Vaillant, Miss. Réveil Pays Comalis, Rept. & Batr. 1882, p. 19; Tristram, Fauna West. Palest. 1884, p. 150; Lataste, Ann. Mus. Civ. Genova, ser. 2, ii. (xxii.) 1885, p. 483; Werner, Verh. zool.-bot. Ges. Wien, xlii. 1892, p. 354; *op. cit.* xliv. 1895, p. 82.

*Lacerta deserti*, M.-Edw. Ann. Sc. Nat. xvi. 1829, pp. 79 et 86, pl. vi. fig. 8 and pl. viii. fig. 6 (*nec* Lepechin); Strauch, Mém. Ac. St. Pétersb. (vii.) iv. no. 7, 1862, p. 32; Bedriaga, Bull. Soc. Imp. Nat. Mosc. 1879, no. 3, p. 31.

*Scapteira maculata*, Gray, Ann. Mag. N. H. i. 1838, p. 281.

*Zootoca deserti*, Günther, Proc. Zool. Soc. 1859, p. 470; *op. cit.* 1864, p. 488; Blgr. Proc. Zool. Soc. 1881, p. 741.

*Acanthodactylus bedriagai*, Lataste, Le Natur. 1881, p. 357; Blgr. Proc. Zool. Soc. 1881, p. 746, pl. lxiii. fig. 1; Boettger, Kobelt's Reis. Alg. u. Tun. 1885, p. 469.



*Acanthodactylus vulgaris* (non Dum. & Bibr.), Vaill. Miss. Révoil Pays Çomalis, Rept. & Batr. 1882, p. 19.

*Acanthodactylus pardalis*, Blgr. Cat. Liz. B. M. iii. 1887, p. 65; Trans. Zool. Soc. xiii. 1891, p. 131; Ann. Mus. Civ. Genova, ser. 2, xvii. (xxxvii.) 1897, p. 278; Anderson, Proc. Zool. Soc. 1892, p. 14; Herpet. Arabia & Egypt, 1896, p. 102; König, Verh. (S.B.) nat. Ver. Bonn, 1892, p. 19; Werner, Verh. zool.-bot. Ges. Wien, xlii. 1892, p. 354; op. cit. xlv. 1893, p. 82; Boettger, Kat. Rept. Mus. Senck. 1893, p. 90; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 112; Peracca, Boll. Mus. Torino, ix. 1894, no. 167, p. 7.

16 ♂ and 20 ♀. Maryut District.

Snout obtusely or acutely pointed; two entire supraoculars separated from the superciliaries by two lines of granules: the first supraocular broken up generally into two or three pieces or wholly into granules, rarely entire, and the fourth reduced to granules, but with one or two small pieces remaining. Subocular generally between the fourth and fifth upper labials, rarely between the third and fourth, or the fifth and sixth, not unfrequently entering the labial margin. Front margin of the ear generally denticulated, but the denticles are, in some, reduced to granules. Temporals variable, usually convex, elongate, rounded, or polygonal, smooth or keeled. Dorsal scales granular, convex, smooth, but occasionally flattened and becoming rhomboidal and imbricate posteriorly, and more or less keeled and increasing in size towards the hinder part of the body, but always smaller than the caudal scales. Fifty-six to eighty-five scales round the middle of the body. Ten to fourteen ventral plates, generally twelve, broader than long, and arranged longitudinally and transversely. An enlarged præanal plate, with two or three smaller plates anterior to it and also at its sides. Limbs moderately long, variable in length, and rather stout; hind limb generally reaches in advance of the shoulder, in some examples more so, but in others it only touches the axilla. Digital denticulations feebly developed on the fingers, moderately strong on the toes, longest on the fourth; claws short, moderately curved. Tail about once and a half as long as the body and head, or longer; scales on its upper surface large, generally strongly keeled, those on the under surface smooth or obtusely keeled. Fifteen to twenty-four femoral pores.

Lineated, in the young state, with six white and seven black bands on the middle of the body. The bands or lines are lost with advancing age and the dorsal surface is covered with a broad network of black bands, here and there marked with white spots in longitudinal arrangement, as they are the remains of the white bands.

General colour, in the adult, olive-green, fawn, or even almost orange-red. Very variable in the degree to which the markings are developed. Underparts generally white, but in some the throat and ventral surface are finely speckled with dusky.

The largest Egyptian male has the following measurements:—Snout to vent 68 millim., tail 99 millim.; but the species attains to a considerably larger size in Algeria and Somaliland.



ACANTHODACTYLUS PARDALIS.

Fig. 1 ♂, Fig. 2 ♀, & Fig. 3 ♂ taken in Coftu (10th April); Fig. 4 head of ♂, A. Savignyi.



I have met with *A. pardalis* only in the Maryut District and at Alexandria on stony semi-arid land, but Gasco has recorded an example from the neighbourhood of Cairo.

In a gravid female of this species, each egg measured 11 millim. long, the length of the body of the lizard, from the snout to the vent, being only 62 millim. In a female of *A. scutellatus*, 65 millim. from snout to vent, there was only one egg in the left oviduct, and so large—13 millim. in length—that with the two eggs that were present in the right oviduct the entire abdominal space available was completely filled up. This paucity of eggs may possibly explain why the young of the members of this genus and also of *Eremias* are so seldom observed compared with the young of other genera of lizards.

I captured a male and female (Pl. XXI. figs. 2 & 3) in sexual embrace in the month of April, and it was this female which already had her oviducts full of mature eggs.

It ranges southwards to Somaliland, northwards to Syria, and westwards from the delta of Egypt through Cyrenaica, Tripoli, Tunisia, and Algeria to the Sahara, at various altitudes up to 3000 feet.

In seventy-six specimens examined by me, the exception was to meet with an entire first supraocular. It was generally broken up into small pieces varying from 2 to 10 in number, while in others it was granular<sup>1</sup>. Lizards, however, with this shield entire are met with in Syria (Beersheba, Jerusalem), Tripoli (Africa), Tunisia, Batna, the Aures Mountains, Bou-Saada, and from the Sahara between Biskra and Tuggurt. In all, the fourth supraocular was invariably granular. The subocular occasionally reaches the labial margin. It does so in six specimens from the Maryut District, in one from Jerusalem, and in another from Algeria. In the five other species of this genus in which the subocular is excluded from the labial margin, viz. *A. boskianus*, *syriacus*, *schreiberi*, *scutellatus*, and *cantoris*, I have never met with any exception to the rule, whereas in *A. vulgaris*, *tristrami*, and *micropholis*, in which that shield normally borders the lip, it is occasionally excluded. *A. boskianus*, *syriacus*, and *schreiberi* are all closely allied species, and *A. vulgaris*, *pardalis*, and *tristrami* form another group. The two species *A. scutellatus* and *A. cantor*<sup>is</sup> are intimately related to each other by the structure of their digits and they cannot rightly be compared with any of the others. *A. micropholis*, on the other hand, has a distinct relationship with *A. boskianus*, and through it to *A. scutellatus* and *A. cantor*<sup>is</sup>.

In *A. pardalis* a supplementary labial is sometimes present. Thus it occurs in one specimen from each of the following localities, viz. Maryut, Duiat, Batna, Algeria; in five from Bou-Saada; in the same number from the Aures Mountains; and in seven

<sup>1</sup> In one of the types of *Scapteira maculata*, Gray, from Tripoli, it is broken up into granules and small shields, in all 10 in number; and in this respect it closely resembles the lizard described by Audouin as *Lacerta savignyi*, in which the first supraocular is represented as reduced to 8 pieces.

from between Biskra and Tuggurt. In six of these cases, however, it exists only on one side of the head.

A supplementary upper labial is also met with in specimens of *A. vulgaris*, both in Africa (Tangiers) and in Europe (Abrantes, Portugal), and likewise in *A. scutellatus*.

The denticles of the ear are subject to much variation, being well developed in some and practically absent in others.

From the table that follows (pp. 158-160) it will be seen that although there is a difference of 29 between the lowest and highest number of scales, in the totality of the specimens tabulated, no such disparity is ever met with in any one locality. In Somaliland the variation is 16, in Palestine 6, in the Maryut District, Egypt, 19, in Tripoli and Tunisia 16, on the plateau of Algeria and the Aures Mountains 16, and in the Sahara 16. The highest numbers in these localities are respectively 78, 80, 81, 72, 85, and 77. The specimens from Tripoli and Duiat belong to the small form of this lizard from the Sahara described by Günther as *Zootoca deserti*, while those from Batna, that is from the high plateau of Algeria, and from the Aures Mountains attain to the greatest size of all (76 millim. from snout to vent), and are somewhat heavier built than those from Tunisia, Egypt, Palestine, and Somaliland, but the difference in relative size of these lizards from these localities is not great. Saharian specimens of *Zootoca deserti* attain to 65 millim. from snout to vent, whereas the largest male from the Maryut District is only 3 millim. longer; the largest specimen of the same sex from Palestine is 71, from Somaliland 74, and from the plateau of Algeria 76 millim. It is thus evident that the somewhat smaller Saharian lizards by their largest individuals, 65 millim., lead into the Egyptian lizards and into those of the Tell of Algeria. As pointed out by Lataste, the proportions of those from the high plateau of Algeria, and I may also add from the Aures Mountains, are sometimes even heavier than those of *A. vulgaris*, so that when these large forms and those from Egypt and Palestine are compared with the Saharian lizards the difference may appear considerable, but it is only one of degree.

The scales are generally almost granular, but in some specimens they are rhomboidal, larger, and more flattened than granules. These two modifications may either be smooth or more or less carinate, and this may be the case among individuals of the same sex from the same locality. In the larger of the two specimens from Tripoli, a gravid female (53 millim. from snout to vent), the dorsal scales are smooth or almost so to the base of the tail, but in the young female over a considerable part of the hinder half of the back they are distinctly keeled, and on the dorsum of the tail are strongly so, while in the larger specimen the caudal keels are not quite so markedly carinate.

In the lizards found at Maryut and in Palestine the dorsal scales are smooth, but in a specimen from Egypt, in the Paris Museum, they are strongly keeled and imbricate, which is also the case in specimens from Somaliland and Algeria.



The digits of different individuals of the various species vary considerably in length, but they are shorter, as a rule, in *A. pardalis* and in *A. tristrami* than in the other species. In *A. syriacus*, *A. vulgaris*, and *A. schreiberi* they are a little longer, and still more so in *A. boskianus*, while the longest digits are met with in *A. micropholis*, *A. scutellatus*, and *A. cantoris*. The Somaliland lizard described by Lataste as *A. vaillanti*, which measures 74 millim. from snout to vent, has its fourth toe 15 millim. long, whereas a specimen of *A. pardalis* from the Aures Mountains, with its body 76 millim., has the corresponding toe only 11.4 millim. in length. On the other hand, an individual from the Maryut District, 57 millim. from the snout to the vent, has its fourth toe 11 millim. long, so that the variation in the length of the digits of *A. pardalis* is very considerable.

The lizard described by Audouin under the name of *Lacerta savignyi* is known only from the figure given by Savigny<sup>1</sup>. From the fact that it appears as one of the discoveries made by the members of the French Expedition we are entitled to conclude that it was obtained by them in Egypt. Up to the present time, however, not a single lizard agreeing correctly with the figure has been discovered either in Egypt or elsewhere, but one or two in Egypt and in Somaliland have been found so resembling it as to suggest the possibility that the difficulty that exists in reconciling them with the drawing may be due to the imperfections of the latter.

Professor Vaillant in his account of the *Acanthodactyli* collected on Révoil's Expedition to Somaliland referred them to two species, viz. to *A. vulgaris* and *A. savignyi*. They were apparently all collected at Lasgori on the sea-coast. I have been enabled carefully to examine these specimens, thanks to the courtesy of Professor Vaillant. They have already all been fully described by M. Lataste in his valuable contribution to our knowledge of this genus. The conclusion he arrived at regarding them was that they represented two species, viz. : one which he considered to be *A. savignyi*, Audouin; and the second a new species, which he named *A. vaillanti*<sup>2</sup>.

In 1887, the third volume of Mr. Boulenger's Catalogue of Lizards appeared, in which he stated that he had examined the types of Lichtenstein's *Lacerta pardalis*, and had found them to be specifically identical with *A. bedriagai*, Lataste (types of which were in the British Museum, presented by M. Lataste himself), and with the specimens which Lataste had referred to *A. savignyi*.

After a careful examination of the specimens 5847, ♂ and ♀, from Lasgori, Somaliland, i. e. probably the two which were originally regarded by Prof. Vaillant as *A. vulgaris*, it appears to me that they present all the features of *A. pardalis*. In these specimens the first supraocular is large with a few granules externally, while the fourth is completely decomposed. The snout is more or less elongate, and recalls

<sup>1</sup> Descr. de l'Égypte, H. N. i. ? 1829, pp. 172-173, Suppl. pl. i. figs. 8. 1-8. s.

<sup>2</sup> Ann. Mus. Civ. Genova, (2) ii. 1885, p. 509.

the form of the snout of *A. savignyi*; but the ventrals vary from 12-14, and externally are not well defined off from the scales of the sides. A small supplementary labial excludes the subocular from the labial margin. The dorsal scales are irregular, nearly smooth, or obtusely keeled, the temporals are smooth, the digits short, and the coloration is that of *A. pardalis*.

Three other specimens (No. 5849) from the same locality as the former were referred by Professor Vaillant to *A. savignyi* along with a fourth, but much larger individual, also from Lasgori (No. \*6484). The latter was the specimen described by M. Lataste as *A. vaillanti*, and by Mr. Boulenger as *A. savignyi*. One of the three has the first and fourth supraoculars completely resolved into small pieces, and the subocular entering the labial margin by a fine point. The dorsal scales are rather strongly carinated, the digits are short, and the coloration is the same as that of *A. pardalis*. The heads of these three specimens are proportionately shorter and heavier than the head of *A. vaillanti*, which resembles that of the specimens from Lasgori that are referred to *A. vulgaris*. The dorsal scales of these three specimens resemble in their carination those of *A. vaillanti*, which has its temporals keeled.

In all of these specimens, including the type of *A. vaillanti*, I count 12 ventrals. In the largest of the three there are 26 longitudinal rows, 27 and 29 in the other two, and 30 in *A. vaillanti*. The ventrals of the last are proportionally somewhat slightly smaller than those of *A. pardalis*.

In *A. vaillanti*, the first supraocular is not more decomposed than it occasionally is in undoubted examples of *A. pardalis*. In the Paris Museum there is a specimen of *A. pardalis* bearing the name *A. cruentatus*, Pallas (No. <sup>2454</sup>/<sub>5289</sub>), in which the first supraocular, and also the fourth, as stated by M. Lataste, are absolutely decomposed as in the figure of *A. savignyi*. An azygos shield occurs behind the frontonasal as in *A. vaillanti*. The præfrontals are strongly ridged and the ridges are continued on to the frontal, which has consequently a deep median groove. The subocular does not border the lip, and lies between the fifth and sixth labials, but the fifth is small on the right side and large on the left. The temporals are keeled, but not so strongly as in *A. vaillanti*. The dorsal scales are almost granular anteriorly, large posteriorly, more or less imbricate and strongly keeled. The ventrals are broader than long, 10-12 in number from side to side, and arranged longitudinally and transversely. The posterior præanal is the largest. The digits are moderately long, the fringe short and strong, but not prominent. The hind limb reaches the collar. The colour and markings are the same as in *A. pardalis*. The head of this specimen has the form of that generally present in *A. pardalis*, but slightly more pointed. This specimen is stated to have been obtained in Egypt, and it seems to me to efficiently link the foregoing Somaliland lizards, excluding *A. vaillanti*, to *A. pardalis*, Licht., while at the same time it further illustrates the great variability of the species.

The following table illustrates the leading details of the specimens in the Paris Museum :—

No. of specimen.	Sex.	Snout to vent.	Tail.	Scales round body.	Ventrals.	Scales between thighs.	Length of fourth toe.	Femoral pores.	Locality.
*6484	♂	74	145	69	10-12	24	15	$\frac{21}{23}$	Somaliland. Type of <i>A. vaillanti</i> , [Lataste.
5849	♂	68	110	62	10-12	16	12.3	$\frac{24}{21}$	
5847	♂	64	..	66	12	20	10	$\frac{23}{21}$	
<u>2444</u>	♂	64	..	75	12	27	10.4	$\frac{22}{22}$	Egypt.
<u>5320</u>	♂	64	..	75	12	27	10.4	$\frac{18}{18}$	"
"	♀	62	90	72	12	19	10.5	$\frac{23}{23}$	"
2454	♀	60	105	76	12	29	12	$\frac{23}{23}$	"
5289	♀	57	..	78	14	24	8.6	$\frac{16}{17}$	Somaliland.
5847	♀	57	..	78	14	24	8.6	$\frac{19}{20}$	"
5849	♂	53	73	72	12	20	9	$\frac{19}{20}$	"
"	♂	52	84	64	12	20	10	$\frac{19}{19}$	"

I agree with Mr. Boulenger that *A. vaillanti* presents a strong resemblance to the figure of *A. savignyi*. The latter, however, gives us no information about the condition of the subocular or the character of the temporals, while it only indicates, in a general way, the features of the dorsal scales of the lizard it represents. Moreover, it only shows the presence of 8 ventral plates at the most. In identifying it with *A. vaillanti*, the existence of a subocular bordering the lip, keeled temporals, and the presence of 10 or 12 ventral plates have therefore to be imagined. The evidence of the identity of the two is therefore not conclusive.

*A. tristrami* is a closely allied species to *A. vulgaris* and also to *A. pardalis*; the four specimens in the British Museum are adults from Lebanon and Mount Hermon, and between Baalbeck and Shtora. The type, a female, was obtained by Canon Tristram from the first of these localities, and probably at a considerable elevation. The other three specimens were collected by myself at heights varying from 2400 ft. to 3800 ft. above the sea-level. The uniformly flattened and non-carinate dorsal scales, their gradual passage between the thighs into the granules at the base of the limbs, and their greater size on the middle of the back enable it to be distinguished from *A. pardalis*; but specimens of the latter are now and again met with that show scales here and there exactly resembling those of this nearly allied form. The subcaudals at the base of the tail, for about a third of its length, are perfectly smooth; but in many

*Measurements &c. of A. pardalis, Licht. (in millim.).*

Sex.	Snout to vent.	Tail.	Scales round body.	Ventrals.	Scales between thighs.	Length of fourth toe.	Femoral pores.	Locality.
♂ ....	71	..	74	12	32	12	$\frac{19}{18}$	Beersheba.
♂ ....	70	..	76	12	32	11.2	$\frac{21}{20}$	Jerusalem.
♂ ....	64	..	77	12	36	10	$\frac{22}{23}$	"
♂ ....	70	103	78	12	35	10.7	$\frac{23}{21}$	Beersheba.
♀ ....	71	92	79	12	24	11.2	$\frac{16}{17}$	Jerusalem.
♀ ....	71	84	80	12	27	10.1	$\frac{16}{16}$	"
♀ ....	63	90	62	12	24	10.8	$\frac{17}{18}$	Maryut District.
♀ ....	58	64	63	12	25	9.5	$\frac{19}{21}$	" "
♀ ....	61	85	64	12	22	10	$\frac{19}{21}$	" "
♀* ....	62	82	65	12	27	11	$\frac{15}{15}$	" "
♀ ....	61	92	65	12	21	10	$\frac{17}{17}$	" "
♀ ....	61	..	66	12	26	10	$\frac{17}{17}$	" "
♀ ....	59	85	70	12	25	10	$\frac{20}{21}$	" "
♀ ....	57	89	70	12	28	11	$\frac{17}{18}$	" "
♂* ....	64	91	71	12	28	11	$\frac{19}{21}$	" "
♀ ....	57	85	71	12	21	9.8	$\frac{17}{16}$	" "
♀ ....	55	81	71	12	28	9	$\frac{18}{17}$	" "
♀ ....	59	73	71	12	24	10	$\frac{16}{16}$	" "
♂ ....	60	98	72	12	35	10.8	$\frac{19}{19}$	" "
♀ ....	60	78	72	12	23	10.5	$\frac{18}{19}$	" "
♀ ....	61	..	72	12	23	9.2	$\frac{20}{17}$	" "
♀ ....	63	..	72	12	23	10	$\frac{19}{19}$	" "
♂ ....	58	92	72	12	27	11.4	$\frac{24}{23}$	" "
♂ ....	63	..	72	12	25	11.2	$\frac{24}{24}$	" "
♂ ....	62	100	73	12	27	11	$\frac{19}{20}$	" "
♀ ....	58	93	73	12	31	11	$\frac{18}{16}$	" "

\* Taken *in coitu*, April 12, 1892.

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Scales round body.	Ventrals.	Scales between thighs.	Length of fourth toe.	Femoral pores.	Locality.
♀ ....	57	..	73	12	20	10	$\frac{17}{17}$	Maryut District.
♂ ....	59	..	74	12	28	10.9	$\frac{20}{21}$	
♀ ....	58	93	74	12	31	11	$\frac{19}{20}$	
♀ ....	65	..	74	13	29	10	$\frac{19}{19}$	
♂ ....	60	..	75	12	28	11.5	$\frac{20}{21}$	
♀ ....	57	..	75	12	22	10	$\frac{18}{19}$	
♀ ....	54	85	75	12	25	11	$\frac{17}{15}$	
♂ ....	61	102	76	12	26	10	$\frac{22}{20}$	
♂ ....	67	114	76	12	31	10.3	$\frac{23}{23}$	
♂ ....	68	99	76	12	38	10.8	$\frac{22}{23}$	
♂ ....	61	..	77	12	38	10.4	$\frac{23}{22}$	
♂ ....	56	..	77	12	28	10	$\frac{21}{24}$	
♂ ....	54	..	79	12	28	10	$\frac{21}{24}$	
♂ ....	68	..	80	12	37	10.8	$\frac{19}{20}$	
♂ ....	65	117	80	12	36	11	$\frac{22}{21}$	
♂ ....	59	81	81	12	35	10.2	$\frac{21}{22}$	
♂ ....	69	96	69	12	25	11	$\frac{21}{21}$	El Guerah. Type of <i>A. bedriagai</i> , Lat.
♂ ....	71	..	72	14	26	11	$\frac{23}{22}$	Var. <i>bedriagai</i> , Lat. Batna.
♂ ....	67	98	77	12-14	34	10.9	$\frac{20}{21}$	Aures Mountains.
♂ ....	68	96	77	14	25	11	$\frac{19}{21}$	" "
♂ ....	76	..	85	12-14	30	11.4	$\frac{19}{19}$	" "
♂ ....	51	..	56	12	17	10.9	$\frac{20}{19}$	Gabes, Tunisia.
♂ ....	53	..	59	12	22	10	$\frac{19}{20}$	Duirat.
♀ ....	63	..	61	12	17	9.5	$\frac{16}{16}$	Bou-Saada.
♂ ....	53	..	63	12	22	10	$\frac{20}{21}$	Duirat.



*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Scales round body.	Ventrals.	Scales between thighs.	Length of fourth toe.	Femoral pores.	Locality.
♀ ....	55	85	63	12	19	8.7	$\frac{17}{18}$	Duirat.
♀ ....	59	..	63	12	17	9.8	$\frac{17}{17}$	"
♂ ....	56	80	63	12	18	10.8	$\frac{22}{22}$	Biskra, Laghouat.
♀ ....	54	77	64	12	18	9.3	$\frac{17}{17}$	Duirat.
♂ ....	58	98	64	12	17	11	$\frac{19}{19}$	Laghouat.
♀ ....	39	..	67	12	18	8.8	$\frac{19}{19}$	Tripoli. Type of <i>S. maculata</i> , Gray.
♀ ....	61	..	67	12	12	9	$\frac{18}{19}$	Bou-Saada.
♂ ....	64	97	67	12	22	11.5	$\frac{21}{21}$	Biskra, Tuggurt.
♀ ....	58	..	67	12	14	10	$\frac{21}{18}$	Laghouat.
♀ ....	54	72	68	12	17	10	$\frac{17}{18}$	Gabes, Tunisia.
♂ ....	65	..	68	12	23	11	$\frac{21}{19}$	Biskra, Tuggurt.
♂ ....	49	..	68	12	19	9	$\frac{21}{21}$	Wádi Dermel.
♀ ....	59	..	69	12	12	9.5	$\frac{18}{18}$	Bou-Saada.
♀ ....	58	..	70	12	19	9.8	$\frac{18}{18}$	" "
♂ ....	61	105	70	12	19	10.3	$\frac{20}{20}$	Biskra, Tuggurt.
♀ ....	64	..	70	12	16	10	$\frac{18}{17}$	" "
♂ ....	54	82	70	12	19	9.5	$\frac{19}{19}$	Wádi Dermel.
♀ ....	57	70	71	12	13	10	$\frac{16}{15}$	Bou-Saada.
♀ ....	63	..	71	12	18	11	$\frac{19}{20}$	Biskra, Tuggurt.
♀ ....	53	..	72	12	20	9.7	$\frac{16}{16}$	Tripoli. Type of <i>S. maculata</i> , Gray.
♀ ....	59	..	73	12	17	9.5	$\frac{18}{17}$	Biskra, Tuggurt.
♀ ....	65	..	74	12	20	9	$\frac{18}{17}$	Bou-Saada.
♀ ....	65	..	75	12	19	11	$\frac{19}{19}$	" "
♂ ....	63	94	75	12	23	11	$\frac{18}{20}$	Biskra, Tuggurt.
♂ ....	44	64	77	12	19	9	$\frac{19}{19}$	N'Goussa and Beni Mzab. Type of <i>Zootoca deserti</i> , Gthr.



ACANTHODACTYLUS SCUTELLATUS.

Figs. 1 & 2 ♂, Wādī Halla; Fig. 3 ♂, Matariyeh; Figs. 4 & 5 ♂, Gizeh; Fig. 6, gravid ♀, Suez District.



specimens of *A. pardalis* this also occurs, however, on a more limited area, so that the difference between the two in this respect is only one of degree. The digital denticulations are feebly developed, as in *A. vulgaris*; there are only two entire supra-oculars, as in that species; and, as occurs generally in it, the subocular borders the lip. All of these characters, however, are shared more or less by *A. pardalis*, so that the differences between the three are ill-defined.

## ACANTHODACTYLUS SCUTELLATUS, Aud. (Plate XXII.)

*Lacerta grammica*, part., Licht. Verz. Doubl. Mus. Berl. 1823, p. 100.

*Lacerta scutellata*, Aud. Descr. de l'Égypte, Hist. Nat. i. 1829, p. 172, Suppl. pl. i. figs. 7. 1 to 7. 5;

H. Milne-Edw. Ann. Sc. Nat. xvi. 1829, p. 85.

*Lacerta olivieri*, part., Aud. op. cit. p. 174, Suppl. pl. i. figs. 11. 1 and 11. 2.

*Lacerta dumerilii*, H. Milne-Edw. l. c. pp. 76 & 85, pl. vii. fig. 9.

*Scapteira inornata*, Gray, Ann. & Mag. N. H. i. 1838, p. 281.

*Merole dumerilii*, Gray, l. c. p. 282.

*Acanthodactylus scutellatus*, Dum. & Bibr. v. 1839, p. 272; Gray, Cat. Liz. B. M. 1845, p. 37;

Gervais, Ann. Sc. Nat. (3) x. 1848, p. 204; Peters, Mon. Berl. Ak. 1862, p. 271; op. cit.

1880, p. 308; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 36; Steind. Sitzb. Ak.

Wien, lxii. i. 1870, p. 331; Blgr. Bull. Soc. Zool. France, 1878, p. 185; Proc. Zool. Soc.

1881, p. 744, pl. lxiii. fig. 2; Cat. Liz. B. M. iii. 1887, p. 64; Trans. Zool. Soc. Lond. xiii.

1891, p. 130; Ann. Mus. Civ. Genova, ser. 2, xvii. (xxxvii.) 1897, p. 278; Boettger, Abh.

Senck. Ges. xii. 1881, p. 401; Kat. Rept. Mus. Senck. 1893, p. 90; Lortet, Arch. Mus. Hist.

Nat. Lyon, 1883, iii. p. 187; Tristram, West. Palest., Rept. & Batr. 1884, p. 150; Lataste,

Ann. Mus. Civ. Genova, ser. 2, ii. 1885, p. 491; Anderson, Proc. Zool. Soc. 1892, p. 14;

Herpet. Arabia & Egypt, 1896, p. 102; König, Verh. (S.B.) nat. Ver. Bonn, 1892, p. 19; Olivier,

Mém. Soc. Zool. France, vii. 1894, p. 111; Werner, Verh. zool.-bot. Ges. Wien, 1895, xlv. p. 82;

Francaviglia, Boll. Soc. Rom. Stud. Zool. v. fasc. i. & ii. 1896, p. 45.

*Acanthodactylus inornatus*, Gray, Cat. Liz. B. M. 1845, p. 38.

*Lacerta* (*Scapteira*) *grammica*, Rüppell, Mus. Senck. iii. 1845, p. 304.

*Acanthodactylus savignyi*, var. *schreiberii* (non Blgr.), Vaillant, Miss. Révoil Pays Comalis, Rept. & Batr. 1882, p. 20.

1 ♀. Ain Musa, near Suez.

3. Suez District.

1 ♂. Matariyeh. Dr. Walter Innes.

2 ♀ and 1 ♀. Margin of desert, Gizeh. The late V. Ball, Esq., C.B.

2 ♂, 4 ♀, and 1 juv. Margin of desert, Gizeh.

1 ♂. Desert north of Birket el Kurun. Major R. H. Brown, R.E.

1 ♀. Fayum. Dr. J. C. Mitchell.

1 ♂ and 1 ♀. Wádí Halfa. O. Charlton, Esq.

2 ♂ and 3 ♀. Wádí Halfa. Surgeon-Captain R. H. Penton, D.S.O.

2 ♂, 1 ♀, and 1 juv. Wádí Halfa.

Snout more or less pointed, longer in some than in others; four supraocular shields, the first generally entire, but occasionally showing a slight tendency to division; fourth usually broken up into two or more separate portions posteriorly, with a group of granules intervening between them and the third supraocular; a line of granules separating these shields from the superciliaries which are generally seven in number; subocular broadly excluded from the labial margin, having below it the fourth, fifth, and sixth labials, the fifth and sixth being much smaller than the fourth; temporals more or less conical, somewhat elongate, and feebly keeled. Generally four to six denticles in front of the ear, varying in size, sometimes very small, and occasionally absent. Dorsal scales variable, smallest on the nape, largest between the thighs, smooth or carinated, more or less rhomboidal, and slightly imbricate or granular, sharply marked off from the larger caudal scales. Ventrals 14 to 18 across the middle of the belly, 14 the prevailing number; nearly square, arranged in longitudinal and transverse rows, the halves of a transverse series meeting at a slight angle in the mesial line; the ventrals pass insensibly into the scales on the sides. Collar perfectly free all round. Generally a large præanal, with some enlarged plates lying in front of it, but sometimes broken up. Limbs well developed; hind limb reaching either to the shoulder or to the ear. Digits of the fore limb with four rows of scales, 1 superior, 1 inferior, and 1 on each side; and those of the hind limb with only three rows, viz. a dorso-lateral, a lower row, and one along the external borders of the digits: both sides of the fingers are fringed, but only the external borders of the toes; the lateral scales of the former constitute the fringe, and the external row of scales of the latter the strongly curved denticles of the hind foot, better developed than in any other species. The plates on the under surface of the digits have an obtuse mesial keel. The claws are long and but little curved. Length of the tail variable, sometimes slightly exceeding twice the length of the head and body, but generally shorter; upper caudal scales strongly keeled, those on the under surface of the base smooth, but the remainder more or less keeled. 14 to 27 femoral pores.

Colour bluish green or greyish, yellowish or pale buff, more or less covered with dusky reticulations enclosing pale spots, but occasionally nearly obsolete in yellowish and buff-coloured specimens which are sometimes finely black-spotted. The reticulations occasionally assume the form of short transverse black wavy lines, while in others they become broken up into spots. In some, there is a dusky line from behind the ear along the side, sometimes becoming bluish between the limbs; and indications of dusky longitudinal lines may be present on the hinder part of the body, prolonged more or less along the sides of the tail. The throat occasionally suffused with bluish green. The limbs, especially the hinder limbs, reticulately marked and spotted. Underparts white. The young is spotted with white, which may or may not assume the form of longitudinal lines.



The largest Egyptian ♂ and ♀ are from Wádí Halfa, and measure as follows:—

♂.	Snout to vent	71 millim.,	tail	149 millim.
♀.	"	"	64	"

*A. scutellatus* is found on stony and sandy ground, such as that skirting the margin of the alluvium, *e. g.*, between Gizeh and Abu Roash.

It is seemingly widely distributed over North Africa, as it has been recorded from Somaliland, Sennaar, Nubia, Egypt, Cyrenaica, Tripoli, Tunisia, Algeria, the Algerian Sahara, the Semur district on the west coast of Africa, and from Senegambia. It is also present in the Sinaitic Peninsula and Southern Syria.

From the table (pp. 165–168) recording the measurements of this species it will be observed that not only no Saharian, but also no Algerian or Tunisian lizards, quite attain to the dimensions of the lizards from Wádí Halfa. At the same time, the difference of size between the largest lizard from Duirat, on the confines of Tunisia and Tripoli, and the largest individual from Wádí Halfa is so slight that the lizards from these two regions may be regarded as practically attaining to the same dimensions. Not one of the specimens in my collection from Lower Egypt measures more than 65 millim. from snout to vent; but the lizards figured from Egypt by Savigny, natural size, are quite as large as the Wádí Halfa specimens. The largest individual from the Sahara is a female from Tuggurt, which measures 54 millim. from snout to vent, but it is only 3 millim. shorter than the largest female from Lower Egypt, so that there is no very great difference between the size of the lizards of these two regions, but those from the Sahara are slightly more slender. The specimens from the Sinaitic Peninsula and Syria attain to the dimensions of the Egyptian lizards. On the other hand, this lizard in the western extremity of its distribution is seemingly smaller than in the other regions, as the largest male is only 57 millim. from the snout to the vent. As I have seen only one specimen from Somaliland, it is impossible at present to say to what dimensions it attains in that area. In Lower Egypt, females (Pl. XXII. fig. 6) of a buff colour and with non-carinated scales are not infrequently met with in a gravid condition, and not more than 44 millim. in length from snout to vent; but, at the same time, others resembling them in colour and in the character of the lepidosis, attain 57 millim. long, thus equalling the largest female from the same region, and in which the scales are not quite so granular. These small buff-coloured specimens recall the western variety, *exigua* of Lataste. From these facts it is evident that there are no sharp lines of demarcation between the smaller and larger individuals, and that consequently varieties founded on size cannot be clearly defined.

In the Wádí Halfa individuals (figs. 1 & 2) the scales are larger than in those from Lower Egypt, and are distinctly carinated and more or less imbricate. About Gizeh and elsewhere a feeble carination can be detected in some specimens, but it is very slight compared with what is present at Wádí Halfa.

In the Sinaitic Peninsula and in Southern Syria, the scales are in no sense granular, but they are at the same time extremely small and more or less carinated, a feature which is more or less distinctive of the species in all other localities. At Duirat, Tunisia, and Algeria the scales are more or less rhomboidal, but in some specimens they verge on being granular in both sexes. The Saharian lizards have also rhomboidal keeled scales, but they are somewhat smaller than in the lizards still further to the west (Senegambia, &c.), in which they are more rounded at their free margins and more distinctly keeled. There is thus a considerable degree of difference between the granular-scaled lizards and those with rhomboidal, keeled, somewhat imbricate scales, but the undoubted occurrence of others with scales intermediate between the two extremes links them together.

In lizards from Wádi Halfa the scales vary from 73-87, an amount of variation which practically embraces that which is met with in the typical form in the Fayum and in the southern portion of the delta, Gizeh and Matariyeh. In the Isthmus of Suez, however, the scales manifest a distinct tendency to become more numerous, as they do not fall below 85 and rise to 105. This high type of lepidosis extends into the Sinaitic Peninsula and into Syria, but it is only a slight gradual increase on the highest number found in the typical form. It thus appears that in the number of their scales, as in their other differences, they pass into one another.

In the Saharian region, the number of scales is lower, as a rule, than it is in Egypt. At Laghouat it falls as low as 56, and only exceptionally rises to 80. This means that the scales are larger. These lizards represent *Scapteira inornata*, Gray, and the var. *exigua*, Lataste. Traced still further to the west, viz. in Senegambia, Cape Verd, and Cape Jubi, the scales, while they fall as low as in the Saharian lizards, do not rise above 68.

In lizards referable to var. *dumerilii*, M.-Edw., the upper labials show a distinct tendency to variation, as the fourth and fifth appear to amalgamate in some, and the second or third to divide in others.

*Synopsis of the Egyptian Species of Acanthodactylus.*

- A. Four rows of scales round the fingers, viz. a superior, an inferior, and one externo- and one interno-lateral, each of the latter forming a short fringe; three rows of scales round the toes, viz. a dorso-lateral, an inferior, and one externo-lateral forming a strong fringe.  
Dorsal scales small, rhomboidal, slightly enlarged on the posterior part of the body . . . . . *A. scutellatus.*
- B. Three rows of scales round the digits of the front and hind limbs, viz.: a dorsal, inferior, and externo-lateral forming a fringe.  
Dorsal scales strongly carinate, imbricate, much larger on the hinder part of the back than anteriorly . . . . . *A. boskianus.*  
Dorsal scales small, granular, smooth or more or less carinate . . . . . *A. pardalis.*

*Measurements &c. of A. scutellatus, Aud. (in millim.).*

Sex.	Snout to vent.	Tail.	Scales round body.	Ventrals.	Scales between thighs.	Length of fourth toe.	Femoral pores.	Locality.
♂ ....	47	..	57	14	23	9.6	$\frac{19}{19}$	Somaliland. Paris Museum, No. 5848.
Juv. ..	36	..	73	14	30	9.8	$\frac{20}{18}$	Wādī Halfa.
♂ ....	70	..	73	14	31	16	$\frac{21}{20}$	" "
♂ ....	62	125	74	12	38	15	$\frac{18}{19}$	" "
♀ ....	64	..	76	14	35	13.8	$\frac{20}{20}$	" "
♂ ....	71	149	78	14	28	17	$\frac{21}{20}$	" "
♂ ....	70	..	78	14	31	16.5	$\frac{18}{19}$	" "
♂ ....	70	..	80	14	36	16	$\frac{23}{24}$	" "
♀ ....	62	..	82	14	31	13.5	$\frac{20}{20}$	" "
♀ ....	63	..	83	14	31	14	$\frac{22}{24}$	" "
♀ ....	61	..	86	14	38	14.8	$\frac{18}{19}$	" "
♀ ....	57	..	87	14	34	13.3	$\frac{18}{21}$	" "
♀ ....	37	59	70	14	27	11	$\frac{21}{20}$	Cairo.
♀ ....	56	95	72	14	33	12	..	Wells of Moses.
♂ ....	60	..	76	14	29	14	$\frac{22}{21}$	Fayum.
♀ ....	53	96	76	12	30	12	$\frac{18}{19}$	Gizeh.
♀ ....	46	..	77	15	27	12	$\frac{17}{17}$	"
♂ ....	49	..	78	14	29	12.3	$\frac{19}{18}$	"
♀ ....	50	105	80	13	25	13	$\frac{18}{20}$	"
♀ ....	41	74	80	14	28	11	$\frac{18}{17}$	" Gravid.
♀ ...	56	..	80	13	38	14.5	$\frac{20}{21}$	" "
♀ ....	51	94	83	14	38	12.5	$\frac{19}{19}$	"
♀ ....	50	95	83	14	38	12	$\frac{19}{21}$	"
♀ ....	36	66	83	14	35	10.3	$\frac{15}{15}$	"
♂ ....	52	71	83	14	34	13.5	$\frac{20}{20}$	"
♀ ....	50	78	84	13	37	12	$\frac{17}{19}$	Fayum.

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Scales round body.	Ventrals.	Scales between thighs.	Length of fourth toe.	Femoral pores.	Locality.
♂ ....	57	93	84	14	36	15	$\frac{20}{21}$	Gizeh.
♂ ....	59	..	85	16	39	14	$\frac{21}{22}$	Isthmus of Suez.
♀ ....	42	72	86	14	29	11	$\frac{18}{19}$	Cairo.
♀ ....	46	73	87	14	35	11	$\frac{18}{19}$	Gizeh.
♂ ....	58	102	88	14	36	13.5	$\frac{22}{22}$	"
♂ ....	44	70	88	13	29	11	$\frac{17}{18}$	"
♂ ....	59	105	89	14	34	12	$\frac{21}{22}$	Matariyeh.
♀ ....	57	95	89	16	35	12.5	$\frac{19}{20}$	Wells of Moses.
♀ ....	55	..	89	14	36	12	$\frac{22}{24}$	Isthmus of Suez.
♀ ....	55	..	90	14	29	12.5	$\frac{20}{20}$	" "
♀ ....	57	95	94	14	33	13	$\frac{21}{23}$	" "
♂ ....	42	78	94	15	33	12	$\frac{20}{20}$	Gizeh Desert.
♀ ....	57	93	94	14	31	13	$\frac{20}{22}$	Isthmus of Suez.
♀ ....	54	88	94	14	36	11.5	$\frac{19}{20}$	" "
♂ ....	65	106	99	14	43	15	$\frac{21}{22}$	" "
♀ ....	46	75	100	14	40	11.6	$\frac{17}{16}$	" "
♀ ....	44	..	103	14	37	10	$\frac{18}{19}$	" " Gravid. Pl. XXII. fig. 6.
♂ ....	51	..	105	14	37	14	$\frac{17}{17}$	" "
♀ ....	56	86	91	14	25	11	$\frac{22}{21}$	Mount Sinai.
♂ ....	64	107	96	14	37	14	$\frac{22}{21}$	" "
♂ ....	58	95	82	14	25	12.2	$\frac{23}{22}$	Jaffa.
♂ ....	59	102	83	14	25	13	$\frac{26}{24}$	"
♂ ....	63	99	84	14	26	13	$\frac{25}{24}$	"
♂ ....	52	91	85	14	25	12.4	$\frac{23}{23}$	"
♀ ....	48	83	85	14	26	10.8	$\frac{23}{20}$	Jerusalem.
♂ ....	66	111	89	14	28	13.5	$\frac{26}{26}$	"

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Scales round body.	Ventrals.	Scales between thighs.	Length of fourth toe.	Femoral pores.	Locality.
♂ ....	69	112	91	14	31	13.5	$\frac{27}{25}$	Jaffa.
♂ ....	59	105	93	14	27	13	$\frac{26}{26}$	Jerusalem.
♀ ....	44	67	56	14	22	9.2	$\frac{19}{19}$	Laghouat. Scales decidedly carinated.
♂ ....	48	72	60	14	27	10	$\frac{20}{20}$	Bou-Saada. " "
♀ ....	48	..	61	14	20	10	$\frac{18}{19}$	Laghouat. " "
♀ ....	39	..	64	14	24	10	$\frac{17}{16}$	" " "
♀ ....	50	..	64	14	24	11	$\frac{19}{20}$	Ouargla. " "
♀ ....	56	..	65	14	27	10	$\frac{19}{20}$	Duirat. " "
♂ ....	49	87	65	14	28	11	$\frac{23}{23}$	Bou-Saada. " "
♀ ....	47	91	66	14	24	11.8	$\frac{18}{20}$	Hadjira. " "
♂ ....	67	..	67	14	28	13.5	$\frac{24}{25}$	Duirat. " "
♀ ....	52	82	69	14	23	10	$\frac{21}{21}$	Tuggurt. " "
♂ ....	51	93	69	14	28	10	$\frac{24}{23}$	Bou-Saada. " "
♀ ....	51	87	70	14	25	10	$\frac{20}{20}$	Tuggurt. " "
♂ ....	65	..	71	14	30	12.2	$\frac{23}{24}$	Duirat. " "
♂ ....	67	..	71	14	31	12.6	$\frac{19}{19}$	" " "
♀ ....	60	95	71	14	27	12	$\frac{20}{20}$	" " "
♀ ....	49	75	71	14	28	11.2	$\frac{20}{19}$	Laghouat. " "
♀ ....	54	96	73	14	25	12	$\frac{18}{18}$	Tuggurt. " "
♀ ....	49	89	75	14	26	11.5	$\frac{19}{18}$	Tripoli. Type of <i>A. inornata</i> , Gray. Scales decidedly carinated.
♀ ....	62	91	76	14	28	11	$\frac{20}{20}$	Duirat. " "
♂ ....	46	90	76	14	25	11.5	$\frac{20}{21}$	Hadjira. " "
♀ ....	56	75	77	14	25	11.2	$\frac{19}{19}$	Duirat. " "
♀ ....	44	70	77	14	23	10.3	$\frac{19}{19}$	Hadjira. " "
♂ ....	50	..	80	14	30	11.8	$\frac{21}{22}$	" " "



*Measurements &c. (continued).*

Sex.	Snout to vent.	Ta.l.	Scales round body.	Ventrals.	Scales between thighs.	Length of fourth toe.	Femoral pores.	Locality.
♀ ....	39	70	56	14	19	9.6	$\frac{15}{14}$	Cape Verd. Scales strongly carinated.
♀ ....	39	73	56	14	20	10	$\frac{16}{16}$	" " "
♀ ....	47	75	63	14	18	10	$\frac{21}{21}$	Cape Jubi. Scales distinctly carinated.
Juv. ...	25	43	63	14	21	6.5	$\frac{19}{20}$	" " "
♀ ....	39	..	64	14	20	9	$\frac{17}{17}$	Senegambia. " "
♂ ....	57	105	64	14	21	13	$\frac{21}{19}$	Cape Jubi. " "
♀ ....	52	..	64	14	19	11	$\frac{21}{21}$	" " "
♂ ....	51	93	65	14	20	11.8	$\frac{14}{15}$	Senegambia. " "
♂ ....	39	71	65	14	23	9	$\frac{15}{16}$	" " "
♂ ....	45	96	67	14	20	11	$\frac{16}{18}$	" " "
♀ ....	55	90	68	14	22	10.8	$\frac{16}{16}$	" " "
♀ ....	49	..	68	14	21	10	$\frac{17}{17}$	Cape Jubi. " "



EREMIAS MUCRONATA. Fig. 1 ♂, Fig. 2 ♀, Suakin.

EREMIAS GUTTULATA. Fig. 3 ♂, Beni Hassan; Fig. 4 ♂, Suakin.

EREMIAS RUBROPUNCTATA. Fig. 5 ♀, Gizah; Fig. 6 ♀, Oasis of Kargah.

*For.*



## EREMIAS.

*Eremias*, Wiegman. Herp. Mex. pt. i. 1834, p. 9.

Nostril defined by three or four nasal plates. Lower eyelid scaly, or with a transparent disk frequently broken up into small pieces. Occipital frequently absent. Collar free or detached, transverse, angular or curved; gular fold sometimes present. Dorsal scales small, non-imbricate or imbricate. Ventrals smooth, quadrangular, in straight longitudinal or in irregular and slightly oblique longitudinal series. Digits nearly cylindrical or compressed, with keeled transverse lamellæ below, but without a lateral fringe. Femoral pores present.

## EREMIAS MUCRONATA, Blanford. (Plate XXIII. figs. 1 &amp; 2.)

*Acanthodactylus mucronatus*, Blanford, Zool. of Abyss. 1870, p. 453, fig.

*Eremias mucronata*, Günther, Zool. Rec. 1870, p. 71; Blgr. Ann. Mus. Civ. Gen. ser. 2, xii. (xxxii.) 1891, p. 11; Ann. & Mag. N. H. (6) xvi. 1895, p. 168; Ann. Mus. Civ. Gen. ser. 2, xv. (xxxv.) 1895, p. 13; Proc. Zool. Soc. 1895, p. 534; Ann. Mus. Civ. Gen. ser. 2, xvi. (xxxvi.) 1896, p. 551; op. cit. ser. 2, xvii. (xxxvii.) 1896, p. 9; Proc. Zool. Soc. 1896, p. 920 & figs.; Ann. Mus. Civ. Gen. ser. 2, xvii. (xxxvii.) 1897, p. 278; Boettger, Zool. Anz. 1893, p. 115; Anderson, Herpet. of Arabia & Egypt, 1896, p. 103.

*Eremias lugubris* (non Smith), Vaill. Miss. Révoil Faune et Flor. Pays Comalis, Rept. et Batr. 1882, p. 23.

*Pseuderemias lineolata*, Boettger, Abh. Senck. Ges. xiii. 1883, p. 118.

*Boulengeria mucronata*, Lataste, Ann. Mus. Civ. Gen. ser. 2, ii. (xxii.) 1885, p. 117.

*Eremias brenneri*, part., Blgr. Cat. Liz. B. M. iii. 1887, p. 86.

1 ♀. Plain of Suakin. Colonel Sir Charles Holled Smith, C.B., K.C.M.G., &c.

16 ♂ and 4 ♀. Plain of Suakin. Surgeon-Captain R. H. Penton, D.S.O.

15 ♂ and 10 ♀. Plain of Suakin.

12 ♂, 5 ♀, and 2 juv. Durrur.

Head somewhat depressed; snout rather sharply pointed, moderately long; nasals but little swollen, four in number, two lower, an upper and a posterior. Head-shields occasionally more or less faintly rugose; frontonasal excluded from the rostral by the nasals which form a broad suture behind it; frontonasal and frontal deeply grooved; two prefrontals; three large supraoculars; the first the smallest and occasionally more or less divided; only the second and third supraoculars bordered by granules externally and internally; interparietal small, separated from the small occipital by a line of one or more small pieces; parietals more or less subquadrangular, with a narrow elongate scale along the outer border; temporals granular, smooth; two loreals, the hinder shield small; subocular not entering or entering the labial margin, resting usually on

the 6th and 7th labials, or on the 5th and 6th, rarely on the 7th and 8th or asymmetrically on these labials. No transparent ocular disk. Ear vertically oval, moderately large, its margin occasionally with feeble denticulations. Temporals granular, smooth. Two pairs of chin-shields in contact behind the mental, the third pair being more or less separated by interposed scales. Collar free, from 6 to 12 plates; the first transverse row of ventrals behind the collar longer than broad, and usually 12 in number from shoulder to shoulder. Dorsal scales granular anteriorly, more or less rounded, smooth and juxtaposed, but further back they tend to become longer than broad, and before the sacral region they may or may not show faint indications of an obtuse keel; 62 to 88 scales across the middle of the body including the ventrals. Ventrals broader than long, in longitudinal and transverse series; 6 from side to side, across the middle, with an outer row of smaller plates on each side; 24 to 29 ventrals along the mesial line from the collar to the pores; præanal plate large, more or less round; 14 to 22 femoral pores. Limbs rather long; the hind limb when adnate reaches to the eye or in advance of it; digits rather slender, much compressed; upper surface of fore limb covered with large, smooth, hexagonal plates; upper aspect of hind limb with keeled imbricate scales, largest on the tibial portion; the front of the thigh with a line of broad smooth plates; and the inner aspect of the tibial portion with similar plates and a series of smaller plates. Tail more than twice and a half as long as the body and head, tapered to a fine point; supracaudal scales strongly keeled; subcaudals smooth at the base, afterwards strongly keeled.

Prevailing colour on the upper surface fawn; a black band from the mesial line of the occiput to the base of the tail, or prolonged on to the tail for a short way; two lateral dark bands external to the mesial band, and more or less spotted with fawn, or obscurely with brick-red; a dusky line from the ear to the groin, occasionally obscurely indicated, but usually spotted with fawn. These bands are separated from each other by narrow fawn-coloured bands. Upper surface of the head more or less punctulated with dusky, also the fore limb; hind limb with black reticulations enclosing pale spots. All the bands are more or less prolonged on to the tail, or they may be broken up into brownish-black spots. Underparts pure white, with the exception of that of the tail which is citron-yellow.

In the breeding-season the under surface of the neck of the male is orange or gamboge-yellow, the under surface of the tail having a greenish hue.

This species is very common on the great maritime plain at Durrur and Suakin, and is generally met with on the sandy and pebbly patches that mark the position of the watercourses or *khors* which are covered with a fine grass a foot or more in height and a variety of plants and shrubs, the coloration of the lizard being in wonderful harmony with its surroundings.

The stomachs of the genus *Eremias* generally contain the remains of coleoptera and are remarkably free from sand, as their feeding-grounds lie in stony places.



The type of this species was obtained by Mr. Blanford in the Anseba valley, and since then *E. mucronata* has been found to have a wide distribution over Abyssinia, Eritrea, and Somaliland, extending to the valleys of the Webi and Juba rivers, and along the coast by Assab to the Goolis Mountains near Berbera. It has never been found in the Nile valley, but it has been recorded from Mount Sinai.

In the following table will be found the dimensions of 75 specimens and the variations that occur in their scaling, in their femoral pores, and in the position of the subocular :—

*E. mucronata*, Blanf., arranged according to the number of scales round the body, including the ventrals. (Measurements in millim.)

Sex.	Snout to vent.	Tail.	Scales round body.	Mesial longitudinal line of ventrals.	Position of subocular between labials.	Femoral pores.	Locality.
♂ ....	47	105*	72	25	6 & 7	$\frac{15}{15}$	Suakin.
♀ ....	49	..	72	27	5 & 6	$\frac{17}{17}$	"
♂ ....	44	114	72	26	6 & 7	$\frac{18}{18}$	Durrur.
♂ ....	45	89*	72	23	{ 6 & 7 5 & 6	$\frac{15}{17}$	"
♂ ....	43	101*	72	27	6 & 7	$\frac{18}{18}$	"
♀ ....	45	..	72	28	{ 6 & 7 7 & 8	$\frac{14}{18}$	"
♂ ....	49	134	72	25	{ 6 & 7 5 & 6	$\frac{20}{20}$	Suakin.
♀ ....	47	109	72	29	{ 6 & 7 5 & 6	$\frac{15}{15}$	"
♀ ....	49	115	72	28	{ 6 & 7 5 & 6	$\frac{16}{17}$	"
♂ ....	49	135	72	25	6 & 7	$\frac{19}{20}$	Island of Berbera.
♂ ....	47	122	72	25	{ 6 & 7 5 & 6	$\frac{22}{22}$	Between Laffarugh and Aberiò.
♀ ....	49	124	74	27	6 & 7	$\frac{15}{17}$	Suakin.
Juv. ..	35	92	74	27	{ 5 & 6 6 & 7	$\frac{16}{18}$	Island of Berbera.
♂ ....	49	87*	74	26	{ 7 & 8 6 & 7	$\frac{18}{17}$	Durrur.
♂ ....	47	114	74	27	6 & 7	$\frac{18}{18}$	Suakin.
♂ ....	49	104*	74	27	{ 5 & 6 6 & 7	$\frac{17}{18}$	"
♂ ....	46	110*	74	27	{ 6 & 7 5 & 6	$\frac{18}{18}$	"
♂ ....	40	83*	74	25	{ 5 & 6 6 & 7	$\frac{19}{-}$	"

\* An asterisk indicates that the tail has been renewed.

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Scales round body.	Mesial longitudinal line of ventrals.	Position of subocular between labials.	Femoral pores.	Locality.
♂ ....	50	115*	74	25	{ 6 & 7 7 & 8	$\frac{18}{18}$	Anseba Valley, Abyssinia. Type.
♂ ....	49	..	74	26	5 & 6	$\frac{18}{18}$	Island of Berbera.
♀ ....	49	89*	76	26	6 & 7	$\frac{16}{16}$	Suakin.
♀ ....	47	94*	76	26	5 & 6	$\frac{18}{16}$	"
♂ ....	48	85*	76	27	{ 6 & 7 5 & 6	$\frac{18}{18}$	Durrur.
♂ ....	47	134	76	25	6 & 7	$\frac{16}{16}$	"
♂ ....	44	119	76	26	5 & 6	$\frac{19}{20}$	Suakin.
Juv. ..	35	84	76	27	6 & 7	$\frac{22}{22}$	Island of Berbera.
♂ ....	47	124	76	25	{ 5 & 6 6 & 7	$\frac{18}{18}$	Mount Sinai.
♂ ....	47	123	78	..	6 & 7	$\frac{18}{19}$	Suakin.
♂ ....	49	123	78	25	5 & 6	$\frac{20}{20}$	"
♂ ....	49	120	78	27	5 & 6	$\frac{19}{20}$	"
♂ ....	47	103*	78	26	6 & 7	$\frac{18}{19}$	"
♂ ....	47	103*	78	26	6 & 7	$\frac{17}{17}$	"
♂ ....	46	100*	78	23	6 & 7	$\frac{18}{17}$	"
♂ ....	47	105*	78	25	6 & 7	$\frac{18}{18}$	"
♂ ....	48	129	78	25	{ 6 & 7 5 & 6	$\frac{20}{18}$	"
♀ ....	47	102*	78	28	5 & 6	$\frac{18}{18}$	"
♀ ....	47	92*	78	27	{ 5 & 6 6 & 7	$\frac{16}{16}$	"
♀ ....	49	88*	78	26	{ 5 & 6 6 & 7	$\frac{17}{18}$	"
♂ ....	44	124	78	25	{ 5 & 6 6 & 7	$\frac{20}{18}$	Durrur.
♀ ....	46	111*	78	27	{ 7 & 8 6 & 7	$\frac{18}{19}$	"
♀ ....	46	96*	78	26	6 & 7	$\frac{16}{17}$	"
Juv. ..	28	65	78	29	6 & 7	$\frac{17}{18}$	"
♂ ....	47	123	78	..	6 & 7	$\frac{18}{19}$	Suakin.
♂ ....	47	120	78	27	6 & 7	$\frac{19}{20}$	"

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Scales round body.	Mesial lon- gitudinal line of ventrals.	Position of subocular between labials.	Femoral pores.	Locality.
♂ ....	42	115	78	24	7 & 8	$\frac{18}{18}$	Suakin.
♀ ....	49	..	78	26	5 & 6	$\frac{19}{19}$	"
♂ ....	49	100*	80	27	$\left\{ \begin{array}{l} 7 \text{ \& } 8 \\ 5 \text{ \& } 6 \end{array} \right.$	$\frac{18}{18}$	"
♀ ....	46	116	80	26	5 & 6	$\frac{18}{19}$	"
♀ ....	48	107	80	25	$\left\{ \begin{array}{l} 5 \text{ \& } 6 \\ 6 \text{ \& } 7 \end{array} \right.$	$\frac{15}{16}$	"
♂ ....	47	122	80	25	$\left\{ \begin{array}{l} 7 \text{ \& } 8 \\ 6 \text{ \& } 7 \end{array} \right.$	$\frac{18}{17}$	Durrur.
♀ ....	49	119	80	27	$\left\{ \begin{array}{l} 7 \text{ \& } 8 \\ 6 \text{ \& } 7 \end{array} \right.$	$\frac{16}{16}$	"
♀ ....	46	98*	80	26	5 & 6	$\frac{17}{17}$	"
♂ ....	40	114	80	27	$\left\{ \begin{array}{l} 5 \text{ \& } 6 \\ 6 \text{ \& } 7 \end{array} \right.$	$\frac{18}{17}$	Suakin.
♂ ....	49	..	80	26	6 & 7	$\frac{15}{16}$	Walker's Torrent.
♂ ....	48	135	82	24	5 & 6	$\frac{20}{19}$	Suakin.
♀ ....	47	107	82	25	$\left\{ \begin{array}{l} 6 \text{ \& } 7 \\ 5 \text{ \& } 6 \end{array} \right.$	$\frac{18}{20}$	"
♂ ....	47	128	82	26	6 & 7	$\frac{21}{21}$	Durrur.
♂ ....	46	101*	82	25	6 & 7	$\frac{17}{17}$	"
♂ ....	46	121	82	25	6 & 7	$\frac{19}{18}$	"
♂ ....	49	101*	82	27	6 & 7	$\frac{18}{17}$	Suakin.
♂ ....	44	126	82	25	$\left\{ \begin{array}{l} 6 \text{ \& } 7 \\ 5 \text{ \& } 6 \end{array} \right.$	$\frac{15}{15}$	"
♂ ....	46	119	82	27	$\left\{ \begin{array}{l} 5 \text{ \& } 6 \\ 6 \text{ \& } 7 \end{array} \right.$	$\frac{18}{19}$	"
♀ ....	47	123	82	26	$\left\{ \begin{array}{l} 5 \text{ \& } 6 \\ 6 \text{ \& } 7 \end{array} \right.$	$\frac{16}{15}$	"
♀ ....	47	100	82	26	6 & 7	$\frac{18}{16}$	"
♂ ....	43	..	82	27	6 & 7	$\frac{17}{16}$	"
♂ ....	40	98*	82	28	$\left\{ \begin{array}{l} 7 \text{ \& } 8 \\ 5 \text{ \& } 6 \end{array} \right.$	$\frac{17}{16}$	"
♂ ....	52	139	82	29	7 & 8	$\frac{19}{20}$	Ras Beilul.
♂ ....	51	132	82	27	7 & 8	$\frac{19}{18}$	" "
♂ ....	48	121*	84	26	6 & 7	$\frac{19}{19}$	Suakin.
♂ ....	46	121*	84	24	6 & 7	$\frac{18}{19}$	"

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Scales round body.	Mesial longitudinal line of ventrals.	Position of subocular between labials.	Femoral pores.	Locality.
♂ ....	47	108*	84	26	6 & 7	$\frac{17}{18}$	Suakin.
♂ ....	47	105*	86	25	6 & 7	$\frac{18}{19}$	Durrur.
Juv. . .	29	70	86	26	6 & 7	$\frac{17}{18}$	"
♂ ....	48	135	88	24	6 & 7	$\frac{16}{17}$	Suakin.
♂ ....	47	127	88	27	$\left\{ \begin{array}{l} 5 \text{ \& 6} \\ 6 \text{ \& 7} \end{array} \right.$	$\frac{18}{19}$	"

*Analysis of the position of the suboculars in the foregoing specimens.*

Subocular between	6 & 7 labials in	31
" "	5 & 6	" " 11
" "	7 & 8	" " 3
" "	$\left\{ \begin{array}{l} 5 \text{ \& 6} \\ 6 \text{ \& 7} \end{array} \right.$	" " 22
" "	$\left\{ \begin{array}{l} 5 \text{ \& 6} \\ 7 \text{ \& 8} \end{array} \right.$	" " 2
" "	$\left\{ \begin{array}{l} 6 \text{ \& 7} \\ 7 \text{ \& 8} \end{array} \right.$	" " 6
		<hr/> 75

Four other species of *Eremias* closely related to *E. mucronata* occur in Somaliland, viz. *E. erythrosticta*, *E. smithi*, *E. striata*, and *E. brenneri*, all of which have recently been fully described and very carefully illustrated by Mr. Boulenger<sup>1</sup>.

## EREMIAS GUTTULATA, Licht. (Plate XXIII. figs. 3 &amp; 4.)

*Lacerta guttulata*, Licht. Verz. Doubl. Mus. Berl. 1823, p. 101.

*Lacerta olivieri, part.*, Aud. Descr. de l'Égypte, Hist. Nat. i. ? 1829, p. 175, Suppl. pl. ii. figs. 1 & 2;

M.-Edw. Ann. Sc. Nat. xvi. 1829, pp. 13 & 84, pl. vi. fig. 5.

*Eremias guttulata*, D. & B. v. 1839, p. 310; Smith, Ill. Zool. S. Afr., Rept. 1849, pl. xviii. figs. 8 & 8 a; A. Duméril, Cat. Rept. Paris Mus. 1851, p. 131; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 38; Klunzinger, Zeitschr. Ges. für Erdk. Berl. xiii. 1878, p. 93; Peters, Mon. Berl. Ak. 1880, p. 308; Lortet, Arch. Mus. Hist. Nat. Lyon, iii. 1883, p. 187; Tristram, West. Palest., Rept. & Batr. 1884, p. 150; Blgr. Cat. Liz. B. M. iii. 1887, p. 87;

<sup>1</sup> Proc. Zool. Soc. 1896, p. 920 and figs.

- Trans. Linn. Soc., Zool. v. 1889, p. 99; Trans. Zool. Soc. xiii. 1891, p. 132; Fauna Brit. Ind., Rept. & Batr. 1890, p. 177, fig. 52; Ann. Mus. Civ. Genova, ser. 2, xvi. (xxxvi.) 1896, p. 551; Anderson, Proc. Zool. Soc. 1892, p. 15; op. cit. 1895, p. 646; Herpet. Arabia & Egypt, 1896, pp. 43 & 103; Peracca, Boll. Mus. Torino, ix. 1894, no. 167, p. 8; Werner, Verh. zool.-bot. Ges. Wien, xlv. 1895, p. 82; op. cit. xlv. 1896, p. 16; Boettger, op. cit. xlv. 1896, p. 278.
- Scapteira punctulata*, Gray, Ann. N. H. i. 1838, p. 281.
- Eremias pardalis*, D. & B. v. 1839, p. 312; Smith, Ill. S. Afr. Zool., Rept. 1849, pl. xlviii. figs. 13, 13a, & 13b; Lefebvre, Voy. Abyss., Zool. vi. 1845-50, p. 203; Gervais, Ann. Sc. Nat. (3) x. 1848, p. 204; Guichenot, Explor. Algér., Sc. Phys. Zool. v. 1850, p. 15, pl. i. fig. 2; A. Duméril, Cat. Rept. Paris Mus. 1851, p. 129; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 39; Peters, Mon. Berl. Ak. 1862, p. 271; Westphal-Castelnau, Cat. Coll. Rept. 1869, p. 21; Müller, Verh. nat. Ges. Basel, vi. 1878, p. 625.
- Lacerta (Eremias) guttulata*, Rüppell, Mus. Senck. iii. 1845, p. 304.
- Mesalina pardalis*, Gray, Cat. Liz. B. M. 1845, p. 43; Blanf. East. Persia, Zool. 1876, p. 377; Murray, Zool. Sind, 1884, p. 350.
- Eremias (Mesalina) watsonana*, Stol. Proc. As. Soc. Beng. 1872, p. 86.
- Mesalina watsonana*, Murray, Zool. Sind, 1884, p. 349.
- Mesalina guttulata*, Blanf. Journ. As. Soc. Beng. xlviii. pt. ii. 1879, p. 127.
- Podarces (Mesalina) simoni*, Boettger, Zool. Anz. 1881, p. 571; Abh. Senck. Ges. xiii. 1884, p. 116, pl. i. fig. 3.
- Eremias (Mesalina) balfouri*, Blanf. Proc. Zool. Soc. 1881, p. 467.
- Eremias guttata*, Hart, Fauna and Flora of Sinai &c. 1891, p. 210.
- Eremias martini*, Blgr. Ann. & Mag. N. H. (16) xix. 1897, p. 467.
- 1 ♂. Plain of Suez.
- 1 ♂. Maryut District.
- 1 ♂. Plain of Kafr Gamus.
- 2 ♀. Wádí Hoaf, near Heluan.
- 1 ♂ and 1 ♀. Fayum. Dr. J. C. Mitchell.
- 1 ♂. Beni Hassan. W. M. Blackden, Esq.
- 4 ♂ and 7 ♀. Margin of desert, Luxor.
- 7 ♂ and 8 ♀. Ruins of Karnak.
- 2 ♂ and 3 ♀. Ruins of Medinet Habu.
- 2 ♀. Assuan. Major D. F. Lewis.
- 1 ♀. Philæ.
- 1 ♂ and 1 ♀. Suakin. Surgeon-Captain R. H. Penton, D.S.O.
- 5 ♂ and 3 ♀. Durrur. Major-General A. Hunter, D.S.O.
- 1 ♂. Erkowit Mountains.
- 1 ♂. Akik.

Snout rather pointed. Nasals more or less swollen; frontonasal excluded from the rostral by the nasals which form a suture of variable length; frontonasal and frontal more or less grooved; two præfrontals; four supraoculars; the first and fourth small, the former occasionally divided and the latter not unfrequently broken up into granules;



four to six superciliaries, with a line of granules between them and the second and third supraoculars; interparietal considerably smaller than a frontoparietal, in contact with the occipital; usually two loreals, rarely three, exceptionally four; the subocular enters the labial margin between the fourth and fifth labials, but occasionally between the third and fourth, and fifth and sixth; transparent ocular disk generally broken up into small pieces, usually two; ear not denticulated; temporals smooth, granular; the anterior pairs of chin-shields in contact. A transverse gular fold; collar attached at the middle, feebly developed in some. Dorsal scales juxtaposed, almost granular, slightly increased in size between the thighs and sometimes obtusely keeled in that region; 42 to 61 across the middle of the body including the ventrals. Ventrals generally nearly as broad as long, in 8 to 10 longitudinal series; 26 to 35 in the mesial line from the collar to the pores; præanal plate large, with a semicircle of smaller plates; 10 to 15 femoral pores. Limbs well developed, longer in the males than in the females, the hind limb in the former reaches between the shoulder and the ear, and in the latter to near the shoulder. Tail sometimes less than twice the length of the head and body, but generally more than twice as long. Caudal scales more or less feebly keeled above, smooth below at the base of the tail, but afterwards obtusely keeled.

Greyish olive or olive-brown above, covered with spots usually arranged somewhat in longitudinal series, one half of a spot being generally black and the other half white: the spots all but disappear in some; in others there are longitudinal pale lines or bands along the sides, one arising behind the ear and the other over it, each margined above by a deep brown band. Under surface generally white, but the throat sometimes dusky, and all the ventrals and under surface of the limbs finely punctulated with the same colour. Others are irregularly spotted with black, forming more or less confluent spots, while in some there is a grey line along the mesial line of the back, with dark markings on either side of it.

This and the following species are usually to be met with amid sparse vegetation and loose stones.

This species and *E. rubropunctata* lay five or six eggs in January, but both probably breed at other periods of the year as well. On the 24th of that month, I have measured eggs 10 millim. long and 6 broad, but in none of them was there any trace of an embryo. The smallest of the gravid females of this species was 47 millim., and the largest 53 millim. from snout to vent.

Lichtenstein assigned this species to Egypt and Nubia. I have found it in Lower Egypt associated with *E. rubropunctata*. It is common in Upper Egypt, at Durrur on the shores of the Red Sea, on the plateau of Erkowit to the west of Suakin, and at Akik to the east of Tokar. It occurs in the Sinaitic Peninsula and Arabia, and ranges northwards to Southern Syria, and through Persia, Baluchistan, Afghanistan, S.E. Turkestan to Sind. It apparently extends across the whole of Northern Africa from the Red Sea to the shores of the Atlantic at Morocco.

As will be seen from the following table, *E. guttulata* is subject to a considerable range of variation in the number of the scales round the body in the 101 individuals recorded:—

*E. guttulata*, Licht. (with measurements in millim.), arranged according to the number of the scales round the body, including the ventrals.

Sex.	Snout to vent.	Tail.	Scales round body, including ventrals.	Mesial longitudinal line of ventrals.	Position of subocular between labials.	Femoral pores.	Locality.
♂ ....	40	..	42	30	4 & 5	$\frac{14}{14}$	Durrur.
♂ ....	46	..	43	29	4 & 5	$\frac{14}{14}$	Suakin. Figured.
♂ ....	43	..	43	29	4 & 5	$\frac{14}{14}$	Durrur.
♀ ....	39	..	44	33	4 & 5	$\frac{12}{13}$	Mt. Sinai.
♀ ....	46	..	45	33	4 & 5	$\frac{12}{12}$	Suakin.
♀ ...	48	..	46	29	4 & 5	$\frac{13}{14}$	Hadramut.
♂ ....	46	..	46	28	4 & 5	$\frac{13}{13}$	Erkowit.
Juv. ♂ ..	32	77	46	27	4 & 5	$\frac{12}{12}$	Obok. Type of <i>E. martini</i> , Blgr.
♀ ....	47	..	47	30	4 & 5	$\frac{11}{11}$	Luxor.
♂ ....	45	107	47	31	4 & 5	$\frac{13}{13}$	Aluk, Suakin.
♀ ....	43	95	48	33	4 & 5	$\frac{10}{10}$	Durrur.
♀ ....	42	76	48	33	4 & 5	$\frac{12}{12}$	Aden.
♀ ....	47	..	48	30	4 & 5	$\frac{11}{11}$	Triphul, Afghanistan.
♀ ....	46	..	48	28	$\begin{cases} 4 & 5 \\ 3 & 4 \end{cases}$	$\frac{11}{11}$	Socotra.
♂ ....	51	..	48	28	4 & 5	$\frac{14}{14}$	"
♂ ....	42	102	49	28	4 & 5	$\frac{14}{14}$	Suez.
♂ ....	44	..	49	28	$\begin{cases} 3 & 4 \\ 4 & 5 \end{cases}$	$\frac{10}{10}$	Karnak.
♀ ....	43	73	49	32	$\begin{cases} 3 & 4 \\ 4 & 5 \end{cases}$	$\frac{12}{13}$	"
♀ ....	48	..	49	32	4 & 5	$\frac{13}{14}$	Socotra.
♂ ....	46	102	50	28	4 & 5	$\frac{10}{11}$	Luxor, desert margin.
♀ ....	46	..	50	35	4 & 5	$\frac{12}{13}$	Karnak.
♂ ....	47	110	50	31	4 & 5	$\frac{13}{13}$	Durrur.

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Scales round body, including ventrals.	Mesial longitudinal line of ventrals.	Position of subocular between labials.	Femoral pores.	Locality.
♀ ...	47	..	50	33	4 & 5	$\frac{13}{12}$	Mt. Sinai.
♀ ....	47	..	50	30	4 & 5	$\frac{12}{11}$	Hydrabad, Sind.
♀ ....	47	..	50	34	4 & 5	$\frac{13}{12}$	Mogador, Morocco. <i>E. simoni</i> .
♂ ...	37	..	51	27	4 & 5	$\frac{11}{12}$	Kafr Gamus.
♀ ....	45	..	51	30	4 & 5	$\frac{12}{12}$	Luxor.
♀ ....	46	98	51	30	4 & 5	$\frac{11}{11}$	"
♀ ....	42	..	51	29	4 & 5	$\frac{11}{10}$	Karnak.
♂ ....	46	112	51	31	4 & 5	$\frac{12}{12}$	Luxor.
♀ ....	48	..	51	31	4 & 5	$\frac{10}{11}$	Karnak.
♂ ....	41	..	51	26	4 & 5	$\frac{11}{12}$	"
♀ ....	49	..	51	31	4 & 5	$\frac{12}{12}$	Mt. Sinai.
♀ ...	48	98	51	32	4 & 5	$\frac{12}{12}$	"
♂ ....	38	80	51	30	4 & 5	$\frac{12}{13}$	Gwadar, Baluchistan.
♀ ....	45	..	51	28	4 & 5	$\frac{13}{12}$	Socotra.
♀ ....	51	..	52	30	4 & 5	$\frac{11}{10}$	Luxor.
♂ ....	46	..	52	31	4 & 5	$\frac{12}{12}$	Karnak.
♂ ....	49	110	52	29	4 & 5	$\frac{12}{11}$	Fayum.
♂ ....	46	107	52	32	4 & 5	$\frac{12}{13}$	Karnak.
♀ ....	43	..	52	30	4 & 5	$\frac{12}{12}$	"
♂ ....	45	112	52	28	4 & 5	$\frac{11}{12}$	"
♀ ....	52	..	52	31	4 & 5	$\frac{11}{11}$	Assuan.
♂ ....	44	98	52	29	4 & 5	$\frac{12}{12}$	Durrur.
♂ ....	46	110	52	32	4 & 5	$\frac{12}{12}$	"
♀ ....	46	..	52	32	4 & 5	$\frac{12}{12}$	"
♀ ....	41	..	52	29	4 & 5	$\frac{11}{11}$	"
♂ ....	46	..	52	29	4 & 5	$\frac{14}{15}$	Mt. Sinai.
♀ ....	45	..	52	30	$\begin{cases} 5 & 4 \\ 4 & 5 \end{cases}$	$\frac{11}{11}$	Karman, S.E. Persia.

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Scales round body, including ventrals.	Mesial longitudinal line of ventrals.	Position of subocular between labials.	Femoral pores.	Locality.
♀ ....	42	78	52	31	4 & 5	<sup>12</sup> <sub>13</sub>	Quetta, Baluchistan.
♀ ....	51	..	52	32	4 & 5	<sup>10</sup> <sub>10</sub>	Askabad.
♂ ....	44	93	52	32	4 & 5	<sup>12</sup> <sub>11</sub>	Puli Hatun, trans-Caspian.
♀ ....	47	..	52	28	4 & 5	<sup>11</sup> <sub>10</sub>	Gabes, Tunisia.
♀ ....	43	..	52	32	5 & 6	<sup>10</sup> <sub>10</sub>	Tibremt.
♂ ....	40	87	52	30	4 & 5	<sup>14</sup> <sub>13</sub>	Tuggurt.
♂ ....	46	..	53	30	4 & 5	<sup>11</sup> <sub>12</sub>	Luxor.
♂ ....	45	..	53	28	4 & 5	<sup>12</sup> <sub>13</sub>	Karnak.
♀ ....	45	..	53	29	4 & 5	<sup>13</sup> <sub>12</sub>	Luxor.
♀ ....	43	..	53	29	4 & 5	<sup>12</sup> <sub>11</sub>	Karnak.
♀ ....	51	..	53	30	4 & 5	<sup>11</sup> <sub>12</sub>	Medinet Habu.
	40	83	53	28	5 & 4	<sup>11</sup> <sub>12</sub>	Philæ.
♂ ....	47	109	53	32	4 & 5	<sup>12</sup> <sub>13</sub>	Mount Sinai.
	38	..	53	33	4 & 5	<sup>13</sup> <sub>14</sub>	Dasht, Baluchistan.
♀ ....	45	..	53	28	4 & 5	<sup>10</sup> <sub>11</sub>	Helmund, Baluchistan.
♀ ....	44	..	53	32	5 & 6	<sup>11</sup> <sub>12</sub>	Duirat.
♀ ....	34	..	53	35	4 & 5	<sup>12</sup> <sub>12</sub>	Laghounat.
	47	..	53	34	4 & 5	<sup>13</sup> <sub>12</sub>	Mogador, Morocco.
♂ ....	47	107	54	31	4 & 5	<sup>13</sup> <sub>13</sub>	Beni Hassan.
♀ ....	52	..	54	31	4 & 5	<sup>11</sup> <sub>10</sub>	Assuan. Gravid, 24. 1. 92.
♀ ....	44	..	54	30	4 & 5	<sup>12</sup> <sub>12</sub>	N.Africa. Berlin Museum. Type of <i>Mesalina lichtenstenii</i> , Gray.
♀ ....	53	113	54	33	4 & 5	<sup>12</sup> <sub>11</sub>	Neba Musa Hill, Dead Sea.
♂ ....	43	..	54	27	4 & 5	<sup>13</sup> <sub>13</sub>	Ispahan, between Shiraz and Teheran.
Juv. ..	31	..	54	30	4 & 5	<sup>11</sup> <sub>11</sub>	Gwadar, Baluchistan.
♀ ....	42	..	54	30	4 & 5	<sup>11</sup> <sub>11</sub>	Copt Dagb, Askabad.
♀ ....	41	73	55	29	4 & 5	<sup>13</sup> <sub>12</sub>	Wādī Hoaf, Heluan.
♀ ....	46	..	55	29	4 & 5	<sup>15</sup> <sub>14</sub>	Luxor.

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Scales round body, including ventrals.	Medial longitudinal line of ventrals.	Position of subocular between labials.	Femoral pores.	Locality.
♀ ....	46	..	55	31	4 & 5	13 12	Karnak.
♂ ....	47	..	55	30	4 & 5	11 11	"
Juv. ..	34	70	55	29	4 & 5	11 12	Gwadar, Baluchistan.
♀ ....	50	..	55	30	4 & 5	12 13	Hydrabad, Sind.
♀ ....	44	..	56	29	4 & 5	13 14	Wādī Hoaf, Heluan.
♂ ....	47	..	56	27	4 & 5	13 12	Luxor.
♀ ....	56	96	56	33	4 & 5	11 11	" Gravid, 13. 2. 92.
♀ ....	51	..	56	32	4 & 5	10 11	Karnak.
♂ ....	42	..	56	28	4 & 5	12 11	Medinet Habu.
♀ ....	50	103	56	30	4 & 5	13 13	Mount Sinai.
♂ ....	37	..	56	31	{ 5 & 6 4 & 5	14 13	Sinaitic Peninsula.
♀ ....	44	92	57	29	4 & 5	13 14	Fayum.
♀ ....	44	..	57	33	4 & 5	11 13	Medinet Habu.
♀ ....	47	..	57	34	4 & 5	12 12	Jerusalem.
♂ ....	47	98	57	27	4 & 5	12 11	Gwadar, Baluchistan.
♀ ....	50	85	57	31	4 & 5	15 14	Sind.
♀ ....	47	..	57	30	4 & 5	13 13	"
♂ ....	47	..	58	30	4 & 5	13 11	Medinet Habu.
♀ ...	42	76	58	30	4 & 5	11 11	S.E. of Karman, Persia.
♀ ....	41	91	58	..	4 & 5	12 12	Tuggurt.
♀ ....	51	..	59	30	4 & 5	14 13	Medinet Habu.
♀ ....	43	..	59	33	4 & 5	12 10	Jerusalem.
♂ ....	40	..	59	29	4 & 5	14 13	Susa, Tunisia.
♂ ....	44	92	60	27	5 & 6	13	Maryut District.
♀ ....	49	..	61	30	4 & 5	14 12	Beersheba.



It will be observed that the highest number of scales met with in the Suakin-Durrur district is 52, and the lowest 42. In the valley of the Nile the scales may fall as low as 47 and rise to 60. Although the difference between 52 and 60 is considerable, still there can be no question as to the specific identity of lizards from the Suakin-Durrur district presenting the lowest lepidosis with those from the Nile valley with the highest number of scales. As some of the Suakin-Durrur lizards are sandy-coloured, with dark and pale longitudinal streaks and black and white spots on the back, the contrast that they present to the typical form, more especially when the latter is of a bluish-green tint and almost immaculate (compare figs. 3 and 4 on Plate XXIII.), is most striking. The difference of coloration between these two extremes, as in the great gap between 42 and 60 scales, is thoroughly bridged over by other individuals presenting intermediate characters. I have therefore had no course left me but to regard all the lizards tabulated as specifically identical. In arriving at this conclusion I have, thanks to the courtesy of Mr. Boulenger, been enabled to examine the type of *E. martini*, Blgr., from Obok, which does not appear to me to be separable from this species.

Among 97 specimens in the accompanying table (pp. 177-180), all of African or Asiatic origin, 36 have been ascertained to be males, and 56 to be females. The largest male measures 49 millim. from snout to vent, whereas out of the remainder only 7 of them attain to 47 millim.; while on the other hand 11 of the females are over 50 millim. in length, one even reaching 56 millim. long. The insular variety from the island of Socotra appears to attain to a slightly larger size, and, moreover, it is somewhat more robust than the typical form, and has the ocular disk quite as much broken up as in the Suakin-Durrur individuals.

As any variation in the position of the nasals is rare, it may be mentioned that in one of the specimens from Suakin (Plate XXIII. fig. 4) the posterior nasal is excluded from entering into the free margin of the nostril. The normal number of loreals is two, but in one individual I have observed as many as four, viz. two anteriorly, one above the other, behind the nasals, and two in longitudinal series following them. Another variation of these shields is three in a line, but this also has been noticed only in a single instance; and another abnormality is for the frontonasal to send down a process separating the two loreals. In one individual from Mount Sinai there are two frontonasals, one before the other—a quite abnormal condition.

I have examined the condition of the transparent palpebral disk in 99 specimens from North Africa, Asia, and the island of Socotra. In the plain of Suez, the Maryut District, and the desert at Heluan the disk is divided into five pieces, two in longitudinal series corresponding to the upper half of the disk, with three similarly arranged but much smaller pieces below them, while in one, from the last-mentioned locality, the lower section of the disk is divided into four pieces. In one specimen from the plain of Kafr Gamus the disk is divided vertically in its middle, thus resolving it into two lateral portions. This form of disk occurs in 24 out of 25 specimens from

the Luxor district. In the exception the disk consists of three pieces. Disks of this kind also occur at Beni Hassan in Middle Egypt. Two out of 4 specimens from Medinet Habu conform to the Luxor type of disk, one to the form found at Suez, Maryut and Heluan, while in the fourth the disk is divided into two lower and two upper pieces. At Assuan and Philæ the formula is  $\frac{2}{3}$ , as at Suez &c. At Durrur seven out of eight have the disk consisting only of two pieces, as in the Luxor specimens, while in one it is broken up into as many as 7 pieces, thus  $\frac{2}{5}$ . This much divided form of disk also occurs in the only two specimens I have from Suakin, in one from Erkowit, and in another from Akik.

Out of 52 specimens from the foregoing Egyptian localities, 37 have the palpebral disk divided in two vertically, while 15 have it composed of more than that number; hence the former number, from its prevalence, may be regarded as distinctive of Egypt, but more especially of Upper Egypt and the Eastern Sudan. It is also found in lizards from Baluchistan, Eastern and South-eastern Persia, Afghanistan, and Turkestan. In Sind, the upper half of the disk is divided into two unequal pieces, the anterior of which is twice as large as the posterior, and has below it a piece of nearly its own length, while a small portion is interposed at the point where they meet; but in other lizards from the same locality the palpebral disk resembles that prevailing at Heluan and the plain of Suez. There are still, however, further modifications found in Sind, but they follow much the same kind of division as is present in the Suez example.

At Gabes, in Tunisia, a form of disk different from all the foregoing is met with, as it consists of four pieces, an anterior and posterior and a superior and inferior, more or less symmetrical in their disposition and size; on the other hand, at Susa, in the same region, the disk is divided into six nearly equal-sized pieces, the posterior portion the largest and common to the upper and lower sections of the disk, with two pieces anterior to it superiorly and three inferiorly. Disks of nearly the same type are met with at Laghouat and at Tuggurt, and they are only slight modifications of what occurs at Medinet Habu, which is also the case with the disk of the Morocco lizards described by Boettger as *E. simoni*. Ten examples from Tunisia, the Algerian Sahara, and Morocco have been examined by me, and in only one of them, viz. a specimen from Tibremt, is the disk composed of two pieces, as in lizards of Upper Egypt; in all the others it is broken up into three or six pieces. A nearly similarly divided palpebral disk is found in the Socotran variety.

From the foregoing facts it is evident that the division of the palpebral disk is the subject of great variation. It is most stable in Upper Egypt, the Eastern Sudan, Persia, Baluchistan, Afghanistan, and Turkestan, and most variable in Lower Egypt, the Sinaitic Peninsula, Arabia, Syria, Tunisia, the Algerian Sahara, Morocco, Socotra, and Sind.

## EREMIAS RUBROPUNCTATA, Licht. (Plate XXIII. figs. 5 &amp; 6.)

*Lacerta rubropunctata*, Licht. Verz. Doubl. Mus. Berl. 1823, p. 100; Fitz. Neue Class. Rept. 1826, p. 51.

*Scapteira nebulosa*, Gray, Ann. & Mag. N. H. i. 1838, p. 281.

*Mesalina lichtensteinii*, Gray, l. c. p. 282.

*Eremias rubropunctata*, Dum. & Bibr. v. 1839, p. 297; Smith, Ill. Zool. S. Afr., Rept. (1849) pl. xlviii. figs. 9 & 9a; Klunzinger, Zeitschr. Ges. für Erdk. Berl. xiii. 1878, p. 93; Blgr. Cat. Liz. B. M. iii. 1887, p. 89; Peters, Mon. Berl. Ak. 1880, p. 308; Boettger, Cat. Rept. Mus. Senck. 1893, p. 92; Anderson, Herp. Arabia & Egypt, 1896, p. 103.

*Mesalina rubropunctata*, Gray, Cat. Liz. B. M. 1845, p. 43.

*Lacerta (Eremias) rubropunctata*, Rüpp. Mus. Senck. iii. 1845, p. 304.

? *Eremias guttolineata*, Hart, Fauna and Flora of Sinai &c. 1891, p. 210.

1 ♂ and 4 ♀. Stony plain, east of Suez Canal.

2 ♂ and 1 ♀. Plain of Kafr Gamus.

1 ♀. Margin of desert, Gizeh. The late V. Ball, Esq., C.B.

8 ♂ and 3 ♀. Margin of desert, Gizeh.

1 ♀. Desert, Heluan.

1 ♀. Ras Gharib. Mr. James Robertson.

1 ♂ and 2 ♀. Tel el Amarna.

3 ♂ and 3 ♀. Oasis of Khargeh. Professor Sickenberger, Cairo.

Snout rather pointed; nasals much swollen; frontonasal in contact with the rostral, either broadly or narrowly, and rarely separated from it by the upper nasals; frontonasal and frontal slightly grooved; two præfrontals; two supraoculars; six or seven superciliaries, with a varying number of granules between them and the second supraocular; interparietal slightly smaller than a frontoparietal, in contact with the occipital; two loreals, the anterior narrow and elongate; subocular enters the labial margin usually between the fourth and fifth labials; transparent ocular disk broken up even to as many as seven pieces. Ear not denticulated; temporals smooth, granular; the anterior pairs of chin-shields in contact; a feeble transverse gular fold; collar more or less attached in the mesial line. Dorsal scales minute, granular, rounded, juxtaposed, and smooth; 65 to 78 scales round the middle of the body including the ventrals. Ventrals rather small, arranged in longitudinal lines, 31 to 37 in the mesial line from the collar to before the inner end of the line of femoral pores; 12 in transverse series, rarely 10; each plate generally nearly as broad as long, the two mesial rows have their lateral borders more or less convergent; a large transversely broad præanal plate, with a semicircle of enlarged plates around it. 13 to 19 femoral pores. Limbs well developed, longer in the males than in the females; the hind limb in the former reaches to the shoulder or to between the shoulder and the ear. Tail usually once and a half as long as the body and head, sometimes once and two-thirds, but never twice as long; caudal scales keeled above, smooth below.

Greyish olive above, occasionally dark leaden grey, spotted with reddish or brownish to a varying extent, but never profusely; spots sometimes continued on to the sides of the tail as brown bars; feet and digits generally yellowish, also the rostrals and nasals. Under surface white.

*E. rubropunctata*, Licht. (with measurements in millim.), arranged according to the number of the scales round the body, including the ventrals.

Sex.	Snout to vent.	Tail.	Scales round body, including ventrals.	Medial longitudinal line of ventrals.	Position of subocular between labials.	Femoral pores.	Locality.
♂ ....	54	..	65	34	4 & 5	$\frac{19}{18}$	Oasis of Khargeh.
♂ ....	47	78	67	37	4 & 5	$\frac{17}{16}$	Tel el Amarna.
♂ ....	47	..	68	34	4 & 5	$\frac{14}{15}$	Kafr Gamus.
♀ ....	45	67	68	34	$\left\{ \begin{array}{l} 5 \text{ \& } 6 \\ 4 \text{ \& } 5 \end{array} \right.$	$\frac{16}{17}$	Heluan.
♂ ....	47	..	70	32	4 & 5	$\frac{18}{18}$	Desert, Gizeh.
♂ ....	45	75	70	32	4 & 5	$\frac{17}{17}$	" "
♂ ....	46	..	70	34	$\left\{ \begin{array}{l} 4 \text{ \& } 5 \\ 5 \text{ \& } 6 \end{array} \right.$	$\frac{14}{16}$	Suez.
♂ ....	55	97	70	32	4 & 5	$\frac{14}{15}$	Oasis of Khargeh.
♀ ....	51	..	70	36	4 & 5	$\frac{16}{15}$	Tel el Amarna.
♂ ....	46	..	71	34	4 & 5	$\frac{19}{19}$	Desert, Gizeh.
♀ ....	44	..	71	32	4 & 5	$\frac{13}{14}$	Egypt. ( <i>Scapteira nebulosa</i> , Gray.)
Juv. ..	34	..	71	34	4 & 5	$\frac{16}{17}$	N. Africa. ( <i>L. rubropunctata</i> , Licht., from Berlin Museum.)
♂ ....	49	86	72	35	$\left\{ \begin{array}{l} 4 \text{ \& } 5 \\ 5 \text{ \& } 6 \end{array} \right.$	$\frac{16}{15}$	Desert, Gizeh.
♀ ....	43	..	72	34	4 & 5	$\frac{15}{15}$	" "
♂ ....	44	..	72	35	4 & 5	$\frac{15}{16}$	Kafr Gamus.
♀ ....	44	72	72	35	4 & 5	$\frac{13}{14}$	Suez.
♀ ....	47	79	72	..	4 & 5	$\frac{16}{17}$	Ras Gharib.
Juv. ..	35	55	72	33	4 & 5	$\frac{15}{15}$	Egypt.
♀ ....	58	..	72	37	$\left\{ \begin{array}{l} 4 \text{ \& } 5 \\ 5 \text{ \& } 6 \end{array} \right.$	$\frac{17}{16}$	Oasis of Khargeh.
♀ ....	50	70	72	36	$\left\{ \begin{array}{l} 4 \text{ \& } 5 \\ 5 \text{ \& } 6 \end{array} \right.$	$\frac{15}{14}$	" "
♀ ....	45	..	73	34	4 & 5	$\frac{13}{14}$	Kafr Gamus. (Gravid.)

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Scales round body, including ventrals.	Mesial longitudinal line of ventrals.	Position of subocular between labials.	Femoral pores.	Locality.
♀ ....	42	..	73	35	4 & 5	$\frac{15}{16}$	Suez.
♂ ....	44	78	73	33	4 & 5	$\frac{17}{17}$	Egypt. ( <i>Scapteira nebulosa</i> , Gray.)
♂ ....	46	79	74	31	4 & 5	$\frac{17}{17}$	Desert, Gizeh.
♂ ...	50	....	74	33	4 & 5	$\frac{18}{18}$	" "
♂ ....	41	74	74	33	4 & 5.	$\frac{15}{14}$	Sinaitic Peninsula.
♂ ....	45	80	75	33	4 & 5	$\frac{17}{17}$	Desert, Gizeh.
♀ ....	50	78	75	34	4 & 5	$\frac{14}{15}$	" "
♂ ....	53	....	75	34	5 & 6	$\frac{15}{15}$	Mount Sinai.
♀ ....	55	90	76	36	4 & 5	$\frac{15}{16}$	Desert, Gizeh.
♂ ....	53	76	76	37	4 & 5	$\frac{16}{18}$	Oasis of Khargeh.
♀ ....	51	....	77	35	$\begin{cases} 4 & 5 \\ 5 & 6 \end{cases}$	$\frac{14}{16}$	Desert, Gizeh.
♀ ....	45	71	77	35	$\begin{cases} 5 & 6 \\ 4 & 5 \end{cases}$	$\frac{15}{16}$	Suez.
♂ ....	50	89	78	35	4 & 5	$\frac{16}{16}$	Desert, Gizeh.
♀ ....	56	85	78	38	4 & 5	$\frac{17}{16}$	Oasis of Khargeh.
♀ ....	49	78	78	37	$\begin{cases} 5 & 6 \\ 4 & 5 \end{cases}$	$\frac{17}{15}$	Tel el Amarna.

The upper labials are variable, as the subocular, which in the majority is between the 4th and 5th, is occasionally between the 5th and 6th upper labials, but only asymmetrically, except in the case of an individual from Mount Sinai. In all, the collar is attached at the middle either by the mesial scale or by one or more on either side of it, but the fine granules of the fold are prolonged on, under the scales, nearly to the mesial line; it is least attached in the specimen from Tel el Amarna. There is considerable variation in the extent to which the rostral is in contact with the frontonasal. In ten specimens, in which all the localities are represented, these two shields form a distinct suture, but in six others, and in one from the Wells of Moses, the two shields meet only in a fine point. In two specimens from Gizeh the nasals form a suture in the mesial line separating the rostral from the frontonasal. In one specimen from the oasis of Khargeh there are only 10 ventrals.



Lichtenstein, in his description of the species, mentions Egypt and Nubia as the areas of its distribution. It is common in Lower Egypt in the localities enumerated in the foregoing list of specimens, and is present also in Middle Egypt (Tel el Amarna to Ras Gharib); but although *E. guttulata* is associated with it in Lower and Middle Egypt, it is noteworthy that my collection does not contain a single specimen from the desert on either side of the Nile, to the south of Tel el Amarna. It is common, however, in the oasis of Khargeh, to the west. It ranges northwards through the Sinaitic Peninsula to El Ghor, at the southern end of the Dead Sea, and also into Arabia. To the west of Egypt it has been recorded by Peters from Sokna, in Tripoli, and by Boettger from near Ouargla, in the Algerian Sahara.

The ancient Egyptians occasionally preserved certain small species of lizards as mummies, and kept them in wooden or metal boxes. The top of the box generally had a representation on it, in relief, of the lizard preserved within. These figures, however, were either so rudely executed, or have become so indistinct by age, that I have found it impossible to do more than guess at the genus. Some of them have suggested the genus *Eremias*, others *Chalcides*. They were possibly used as charms.

*Synopsis of Egyptian Species of Eremias.*

- I. Lower nasal divided; nostril defined by four nasals. Ventrals in 6 or 8 longitudinal series. Lower eyelid scaly; nasals in contact behind rostral . . . . . *E. mucronata*.
- II. Lower nasal undivided; nostril defined by three nasals.
  - a. Ventrals in 8 or 10 longitudinal series; subocular enters labial margin. Lower eyelid transparent; upper nasals in contact behind rostral . . . *E. guttulata*.
  - b. Ventrals in 12 longitudinal series, rarely 10; subocular enters labial margin. Lower eyelid transparent; rostral in contact with fronto-nasal . . . . . *E. rubropunctata*.

## SCINCIDÆ.

## MABUIA.

*Mabuia*, part., Fitz. Neue Class. Rept. 1826, p. 23; Blgr. Cat. Liz. B. M. iii. 1887, p. 150.

Limbs well developed; digits 5—5, more or less cylindrical or compressed, with transverse lamellæ below. Nostril in a single nasal. Eyelids movable; lower eyelid with a more or less transparent disk, either undivided or broken up. Ear distinct; tympanum deeply sunk. Postnasal present or absent; supranasals, præfrontals, and frontoparietals present; interparietal single or double, generally distinct, occasionally confluent with the parietals. Palatine bones in contact in the middle line of the palate; pterygoids with or without teeth, separated by the palatal notch which is prolonged forwards mesially to the centre line of the orbits. Maxillary teeth either with conical or with bicuspid crowns.

## MABUIA QUINQUETÆNIATA, Licht. (Plate XXIV. figs. 1–3.)

*Scincus quinquetaniatus*, Licht. Verz. Doubl. Mus. Berl. 1823, p. 103.

*Mabuia quinquetaniata*, Fitz. Neue Class. Rept. 1826, p. 52.

*Scincus savignyi*, Aud. Descr. de l'Égypte, Hist. Nat. i. ? 1829, p. 177, Suppl. pl. ii. figs. 3. 1–3. 4, et var. fig. 4. 1.

*Tiliqua quinquetriata*, Gray, Ann. & Mag. N. H. ii. 1838, p. 290.

*Euprepis savignyi*, Dum. & Bibr. v. 1839, p. 677; Gravenh. N. Acta Leop.-Carol. xxiii. 1851, i. p. 329, pl. xxxiii.; Peters, Mon. Berl. Ak. 1854, p. 618; Gasco, Viagg. in Egitto, pt. ii. 1876, p. 109; Lortet, Arch. Mus. Hist. Nat. Lyon, iii. 1883, p. 187; Francaviglia, Boll. Soc. Rom. Zool. 1896, p. 35.

*Euprepis quinquetaniatus*, Gray, Cat. Liz. B. M. 1845, p. 112; Rüppell, Mus. Senck. iii. 1845, p. 304; Blanf. Zool. Abyss. 1870, p. 456; Steindach. Unger & Kotschy, Insel Cypren, 1865, p. 573.

*Euprepis margaritifera*, Peters, Mon. Berl. Ak. 1854, p. 618; Bocage, Journ. Sc. Lisb. iv. 1872, p. 80.

*Euprepis (Euprepis) margaritifera*, Peters, Reise n. Mossamb. iii. 1882, p. 64, pl. x. fig. 1.

*Euprepis gularis*, Gray, Proc. Zool. Soc. 1864, p. 61.

*Euprepis kirkii*, Gray, Proc. Zool. Soc. 1864, p. 62, pl. ix. fig. 1.

*Euprepis binotatus*, Bocage, Journ. Sc. Lisb. 1867, p. 230, pl. 3. fig. 3.

*Mabuia quinquetaniata*, Blgr. Cat. Liz. B. M. iii. 1887, p. 198; Ann. Mus. Civ. Genova, ser. 2, xvi. (xxxvi.) 1896, p. 551; op. cit. xvii. (xxxvii.) 1897, p. 278; Proc. Zool. Soc. 1896, p. 215; Boettger, Kat. Rept. Mus. Senck. 1893, p. 100; Anderson, Herpet. Arabia & Egypt, 1896, p. 104.

- 2 ♂ and 1 ♀. Gardens and roadside, Gabari, Alexandria.  
 1 ♂ and 1 ♀. Abbasiyeh, near Cairo. Major-General H. M. L. Rundle, D.S.O., C.M.G.  
 1 ♂, 6 ♀, and 1 juv. Alluvium, below Gizeh Pyramids.  
 1 ♀ and 3. The Fayum.  
 1 ♂ and 1. The Fayum. Major R. H. Brown, R.E.  
 4 ♂ and 1 ♀. Tel el Amarna.  
 5 ♂ and 3 ♀. Roadsides, Assiut.  
 4 ♀. Banks of Nile, Edfu.  
 2 ♂ and 2 ♀. Banks of Nile, Assuan.  
 2 ♂ and 1 ♀. Banks of Nile, Philæ.  
 2 ♂ and 1 ♀. Wádí Halfa. Major Henry d'Alton Harkness.  
 3 ♂ and 2 ♀. Wádí Halfa. O. Charlton, Esq.  
 2 ♂, 2 ♀, and 2 juv. Wádí Halfa. Surgeon-Captain R. H. Penton, D.S.O.  
 1 ♀. Suakin.

Snout moderately long; its length equals the distance between the hinder angle of the eye and the posterior border of the ear or slightly exceeds it; nostril placed behind or over the rostro-labial suture; a postnasal resting on the first labial; supranasals in contact behind the rostral; anterior loreal generally not in contact with the first labial, but not unfrequently feebly so (Egypt); frontonasal variable, sometimes nearly as broad as long, and in others broader than long, usually excluded from contact with the frontal by the præfrontals, rarely touching the frontal; frontal generally equals the conjoint length of the frontoparietals and interparietal, its lateral borders much convergent, in contact with the first to the third supraoculars or only with the second and third; the parietals meeting behind the interparietal or rarely separated by it; a pair of nuchals; four supraoculars; five or six superciliaries; six or eight upper labials, generally the fifth, but occasionally the sixth, entering the orbit. Lower eyelid with a transparent disk. Ear about the length of the eye, with 3 to 5, rarely 6 or 7, short lobules at its anterior border, the largest being about the centre of the series, triangular and obtusely pointed. Dorsal scales strongly tricarinate; the nuchals with 4 or 5 feeble carinæ. Thirty-five to forty-two scales round the middle of the body; the median dorsal scales are the largest. The fore limb when laid forwards reaches to nearly the nostril or may fall short of that distance; the hind limb is generally longer than the interval between the axilla and the groin, but not unfrequently shorter; digital lamellæ generally smooth, but occasionally with a feeble mesial keel. Tail variable, once and a half to once and two-thirds as long as the body and head.

Brown above, with five yellow or whitish longitudinal bands, three dorsal and two lateral, continued on to the base of the tail, and all more or less margined with black. Three dark bars or spots, more or less surrounded with white, occur behind the ear on the area between the upper and lower lateral white bands; they are intensely deep bluish black in the male during the breeding-season, when the whole under surface of the head



MABUA QUINQUETÆNIATA.

Fig. 1 ♂, Wādī Haliā; Fig. 2 ♀, Alexandria; Fig. 3, juv., Wādī Haliā.

MABUA VITTATA.

Fig. 4 ♂, Fayum.





from the chin to the chest and the sides of the neck are intensely black, more or less spotted with bluish or bluish white, and the lower yellowish-white longitudinal band which begins at the sides of the nostril is, occasionally, orange-yellow as far back as the shoulder, suffused with blue and spotted with yellow. The five yellowish dorsal bands, frequently in adults and more especially in males, become entirely lost or only faintly indicated. The young are always longitudinally banded. The females are always much less intensely coloured than the males, and the throat is never black but is generally spotted with dusky blue or brownish purple. Upper surfaces of the limbs usually uniform brown, but spotted with yellow in breeding males. Under surface generally yellowish white, with occasionally some bluish spots on the sides of the belly, but in half-grown specimens and in the young, immaculate white. The upper surface of the tail paler than the back, with the white dorsal bands prolonged on to it in a varying degree; its base frequently suffused with vivid blue in half-grown specimens.

This is the most common lizard in the Nile valley and is essentially a species of the alluvium. It abounds along the banks of the Nile, along canals and embankments, on roadsides, and about villages. At Edfu, some boys collected 60 in two hours. It produces 7 eggs on an average at a time, and in the months of January and February the males are in their full breeding-colours.

Dr. J. C. Mitchell has written to me that he has observed a curious habit on the part of a lizard which, from his description, I believe to be *M. quintetæniata*. He says that "the British officers at the Mess House at Assuan often amused themselves on Friday mornings (their free day) by catching a few scorpions, which abound among the stones, and throwing them in proximity to one of these lizards, when it would, regardless of their presence, rush at a scorpion and attack it with great ferocity. The scorpion would erect his tail and watch every movement of his four-footed adversary, After many attempts to get at close quarters the lizard invariably bit the scorpion at the base of the tail, when the latter remained still as if paralyzed, and the former withdrew. Often the fight would go on under our breakfast table in the open air, and in many contests I witnessed I never saw a lizard stung; but I could never discover marks of the lizard's jaw on the scorpion, neither did the victor eat the vanquished."

*M. quintetæniata* is distributed over tropical Africa, as it is present in Benguela, Senegal, Mozambique, Somaliland, Abyssinia, Eritrea, Suakin, and Wádí Halfa. Along the Nile valley it extends to the shores of the Mediterranean and into the Sinaitic Peninsula and Syria. It has also been recorded from Cyprus by Steindachner.

The native name of the two Egyptian species of this genus is سَحْلِيَّةٌ خَضْرَاءُ = *sihliya khudari*, which, I am told, means the lizard of the green beans, possibly from its habit of frequenting the fields on the alluvium.

*Measurements in millim. of M. quinquetæniata, Licht., with the variations in its scaling and in the number of its ear-lobules.*

Sex.	Snout to vent.	Tail.	Front of fore limb to snout.	Fore limb measured posteriorly.	Axilla to groin.	Hind limb posteriorly.	Post-nasal.	Ear-lobules.	No. of scales round body.	Locality.
♀ ....	84	130	28.2	26.3	41	38	1	L. 4 R. 5	40	Alexandria.
♂ ....	84	134	29	27	42	38	1	L. 5 R. 4	37	"
♂ ....	81	..	29	27.5	38	39	1	L. 4 R. 5	38	"
♂ ....	70	102	26	25	34	33	1	L. 3 R. 2	37	Abbasiyeh, near Cairo.
♀ ....	69	109	25	24	34	34	1	4	37	" "
Juv...	44	..	18	14.2	19.5	21.5	1	3	37	Alluvium below Mena Hotel, Gizeh.
♀ ....	55	71	20	19	26	27	1	L. 4 R. 5	36	" " "
♀ ....	58	75	21.5	18	26.3	29	1	4	36	" " "
♀ ....	62	97	24.5	21	27	30	1	4	37	" " "
♂ ....	67	99	24.8	23	34	32.5	1	L. 3 R. 4	36	" " "
♀ ....	68	108	27	23	31	34	1	4	38	" " "
♀ ....	69	80	27	24	31	33	1	4	38	" " "
♀ ....	72	117	25	24	33	33.5	1	L. 3 R. 4	36	" " "
Juv...	53	..	21	18.4	24	26.2	1	4	38	Fayum.
Hf.-gr.	63	..	24.6	21.2	29	31	1	5	38	"
? ....	55	..	22	18.4	25.5	27	1	3	36	"
♀ ....	57	77	21	20	27	27.5	1	L. 4 R. 3	36	"
♀ ....	68	92	22	19.4	29	28.3	1	3	38	"
? ....	83	112	30	26	41	38	1	3	38	"
♂ ....	91	..	35	28	41	41.5	1	L. 5 R. 4	38	Tel el Amarna.
♂ ....	87	122	33	29	41.5	40	1	3	38	" "
♂ ....	72	111	27.7	24	34.5	33.4	1	3	36	" "
♂ ....	70.3	119	26	25	36	34	1	4	37	" "
♀ ....	70	..	26.5	25	32.4	33.5	1	4	38	" "
♂ ....	82	..	32.3	28	38	39	1	4	35	Assiut.

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Front of fore limb to snout.	Fore limb measured posteriorly.	Axilla to groin.	Hind limb measured posteriorly.	Post-nasal.	Ear-lobules.	No. of scales round body.	Locality.
♀ ....	73	104	28	25	35	35	1	5	38	Assiut.
♂ ....	73	98	26	24	35	35	1	5	38	"
♂ ....	72	..	28	26	32	38	1	L. 4 R. 5	38	"
♀ ....	72	107	27.3	24.5	35.3	35	1	$\frac{5}{4}$	37	"
♀ ....	65	..	24	22.5	31	31	1	5	37	"
♂ ....	61	82	24.4	23.5	27.5	31	1	4	38	"
♂ ....	60	87	24.5	19.5	26.5	29	1	L. 5 R. 4	38	"
♀ ....	87	109	32.3	27.6	41.6	40	1	$\frac{5}{6}$	38	Edfu.
♀ ....	85	120	32	28.2	41	39	1	4	38	"
♀ ....	81	135	30	27	37.5	39	1	$\frac{3}{4}$	37	"
♀ ....	76	117	29.5	26.5	36	37.5	1	5	38	"
♂ ....	87	139	31.2	33	41.6	39	1	$\frac{4}{5}$	36	Assuan.
♂ ....	87	..	31	26.2	40	38	1	$\frac{3}{4}$	36	"
♂ ....	87	111	28	26	39	37.7	1	$\frac{4}{5}$	38	"
♀ ....	77	..	28.2	27	37	37.5	1	L. 4 R. 5	40	"
♂ ....	91	..	33	27	44	38	1	4	40	Philæ.
♂ ....	86	..	31	27.8	43.5	39.5	1	$\frac{4}{3}$	36	"
♀ ....	75	111	28	26	39	36	1	4	40	"
♂ ....	83	..	31.5	26.4	41	38	1	5	35	Wádi Halfa.
♂ ....	87	140	32.5	29	41	39	1	5	36	" "
♀ ....	80	108	27.4	26.5	41	37.5	1	L. 4 R. 5	38	" "
♂ ....	86	..	34	30	38	40	1	L. 5 R. 6	38	" "
♂ ....	72	..	28.5	26.4	34	34.5	1	L. 3 R. 5	40	" "
♀ ....	80	..	28	27	42	34	1	5	37	" "
♂ ....	81	41	31	26	39	38	1	$\frac{6}{7}$	38	" "
♀ ....	79	..	26	26	41	36	1	$\frac{4}{3}$	35	" "

*Measurements &c. (continued).*

Sex.	Snout to vent.	Tail.	Front of fore limb to snout.	Fore limb measured posteriorly.	Axilla to groin.	Hind limb posteriorly.	Post-nasal.	Ear-lobules.	No. of scales round body.	Locality.
♀ . . . .	78	124	30	29	38	38	1	$\frac{4}{5}$	39	Wádi Halfa.
Juv. . .	34	..	14.5	12	13.5	17	1	4	39	" "
♂ . . . .	75	129	29	25	34	36	1	$\frac{3}{4}$	38	" "
Juv. . .	31.8	50	12	11	13	15.6	1	3	39	" "
♀ . . . .	75	..	28	24	36	36	1	$\frac{2}{6}$	37	" "
♂ . . . .	75	123	28.7	25.3	34	35.7	1	4	40	" "
♀ . . . .	84	118	29	27	39	39.5	1	$\frac{4}{3}$	42	Suakin.

Among 55 Egyptian specimens, the first labial is more or less generally feebly in contact with the anterior loreal, in 22 cases; and, in 7, in contact with it only on one side of the head and not on the other.

The following is a tabulated list of these variations:—

No. of specimens.	Locality.	Anterior loreal in contact with first labial on both sides.	Anterior loreal in contact with first labial only on one side.
3	Alexandria.	1	1
2	Cairo.	1	1
8	Gizeh.	1	
6	Fayum.	2	
5	Tel el Amarna.	1	1
8	Assiut.	3	
4	Edfu.	2	1
4	Assuan.	4	
14	Wádi Halfa.	6	3
1	Suakin.	1	

It is subject to considerable variation in the extent to which the dorsal bands are

developed. At Wádí Halfa especially there seems a tendency to their suppression, as in 17 out of 34 examples they were practically absent, but the lateral band was well developed and bright orange. In the remaining 17, the bands were generally distinct, but in a few only feebly developed.

It is distinguished from the next species (*M. vittata*) by its somewhat heavier body, greater size, longer limbs, the presence of a postnasal, the greater number of lobules in front of the ear, and by its more numerous body-scales.

MABUIA VITTATA, Olivier. (Plate XXIV. fig. 4.)

*Scincus vittatus*, Olivier, Voy. Emp. Oth. &c. iii. 1804, p. 103, Atlas, 2<sup>e</sup> livr. pl. 29. fig. 1; Aud.

Descr. de l'Égypte, Hist. Nat. i. ? 1829, p. 178, Suppl. pl. ii. figs. 5 & 5. 2.

*Scincus jomardii*, Aud. op. cit. p. 178, Suppl. pl. ii. fig. 6.

*Euprepes olivieri*, Dum. & Bibr. v. 1839, p. 674; Gravenh. N. Acta Ac. Leop.-Carol. xxiii. 1851, p. 327, pl. xxxii.; Gasco, Viagg. in Egitto, pt. ii. 1876, p. 109.

*Euprepes vittatus*, Strauch, Mém. Ac. St. Pétersb. (vii. sér.) 1862, iv. no. 7, p. 43; Boettger, Zeitsch. ges. Natur. (Giebel) Berl. 1877, p. 288; *part.*, Ber. Senck. Ges. 1879-81, p. 187; Tristram, West. Palest., Rept. & Batr. 1884, p. 151.

*Euprepis (Euprepis) libanoticus*, Peters, Mon. Berl. 1864, p. 51.

*Euprepes fellowsii* (*non* Gray), Günther, Proc. Zool. Soc. 1864, p. 489.

*Euprepes (Euprepes) vittatus*, Boettger, Kobelt, Reiscerin. Alg. u. Tunis, 1885, p. 470.

*Mabuia vittata*, Blgr. Cat. Liz. B. M. iii. 1887, p. 176; Trans. Zool. Soc. xiii. 1891, p. 135; Ann. Mag. N. H. (6) ii. 1888, p. 505; Anderson, Proc. Zool. Soc. 1892, p. 16; Herpet. Arabia & Egypt, 1896, p. 104; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 113; Peracca, Boll. Mus. Torino, ix. 1894, no. 167, p. 8; Werner, Verh. zool.-bot. Ges. Wien, 1895, xlv. p. 83.

1 ♂ and 5. Gardens and roadside, Gabari, Alexandria.

1. Margin of desert below Pyramids of Gizeh.

1 ♂ and 2 ♀ and 2 others. Fayum. Major R. H. Brown, R.E.

Snout rather short and blunt; its length equals the distance between the hinder angle of the eye and the posterior border of the ear, or slightly exceeds it; nostril placed behind the rostro-labial suture; postnasal absent or very rarely present; supranasals meeting behind the rostral; anterior loreal in contact with the postlabial; frontonasal considerably broader than long, generally touching the narrow anterior extremity of the frontal, but occasionally shut off from it by the prefrontals; the frontal equals or slightly exceeds the conjoint lengths of a frontoparietal and the interparietal, and is generally in contact with the second and third supraoculars, and sometimes with the first; parietals meet behind the interparietal, rarely separated by it; a pair of transversely elongated nuchals; four supraoculars, the second the largest, generally in contact with the præfrontal; four or five superciliaries, rarely six;



seven upper labials, the fifth below the eye. Lower eyelid with a transparent disk. Ear oval, not much larger than the transparent disk of the eye, with 2 or 3 lobules at its anterior border, the upper the larger and triangular in form. Dorsal scales strongly tricarinate; the nuchals with many feeble carinæ. Thirty to thirty-four rows of scales round the middle of the body, the median dorsal scales but very slightly larger than the lateral. The fore limb when laid forward reaches, as a rule, the middle of the eye, but in some it is only halfway between the ear and the eye; the hind limb is invariably considerably shorter than the interval between the axilla and the groin; subdigital lamellæ smooth. Tail once and a half as long as the body and head, sometimes less.

Dark olive-brown above: a broadish, pale, mesial, dorsal band, edged with black, from the nape to the base of the tail; on each side a very narrow pale lateral line, sometimes white and more or less edged with black, from the side of the neck to the base of the tail; and another, somewhat broader, from in front of and below the eye, through the ear, and along the side to the tail, edged above and below with black; plates of the head, and frequently the dorsal scales, edged with brownish black; underparts yellowish white, with a greenish tinge.

*Measurements in millim. of M. vittata, Oliv., with the variations in its scales and in the number of its ear-lobules.*

Sex.	Snout to vent.	Tail.	Fore limb to snout.	Fore limb measured posteriorly.	Axilla to groin.	Hind limb measured posteriorly.	Postnasal.	Ear-lobules.	Scales round body.	Locality.
♀ ....	68	..	22.8	16.2	38.5	24.8	0	2	32	Alexandria.
♂ ....	60	..	22	16	34.2	25.2	0	2	34	"
♂ ....	61	84	21.3	15.5	33.8	24.5	0	2	32	"
♂ ....	61	103	22	14.8	33.5	23	0	2	33	"
♂ ....	60	..	21	14.9	34	22.5	0	2	32	"
♀ ....	57	84	20	15	30	24	0	2	34	Gizeh, alluvium.
♂ ....	66	108	21.5	15	34	25	0	2	34	Fayum.
♀ ....	57	100	19.5	14.2	30.5	23	0	2	32	"
♀ ....	58	102	20	15	30	22	0	2	33	"
♀ ....	61.5	..	20.5	15.5	34.5	24.5	0	2	32	"
Juv...	43	..	15.5	11	23.2	16	0	2	34	"

This scink is not rare on the roadsides and in the gardens outside Alexandria, and to

the east it is found on the sands at Rosetta, where Olivier obtained the types. It is less common around Cairo, but it is well represented in the Fayum. It ranges westwards from Egypt to Tunisia, Algeria, and the Algerian Sahara, and northwards through Palestine and Syria to the island of Cyprus.

*Synopsis of Egyptian Species of Mabuiæ.*

- 35-42 scales round body. Postnasal present. Frontonasal usually separated  
from the frontal. 3 to 7 short ear-lobules . . . . . *M. quinquetæniata*.  
30-34 scales round body. Postnasal absent. Frontonasal in contact with the  
frontal. 2 or 3 ear-lobules . . . . . *M. vittata*.

## EUMECES.

*Eumeces*, Wieg. Arch. f. Nat. 1835, ii. p. 288.

Limbs well developed; digits 5—5, more or less cylindrical or compressed, with transverse lamellæ below, and not serrated laterally. Nostril in a single nasal, occasionally vertically divided in two. Eyelids well developed, scaly. Ear distinct; tympanum deeply sunk. Supranasals present; postnasal present or absent; præfrontals, frontoparietals, and interparietal distinct. Palatine bones not in contact in the middle line of the palate; pterygoids toothed. Lateral teeth conical or spheroidal.

## EUMECES SCHNEIDERI, Daud. (Plate XXV.)

*Lacerta rufescens*, part., Shaw, Gen. Zool. iii. 1802, p. 285.

*Scincus schneideri*, Daud. Hist. Rept. iv. 1802, p. 291; Is. Geoffr. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 135, pl. iii. fig. 3.

*Scincus cepedii*, Merr. Syst. Amph. 1820, p. 71.

*Scincus pavimentatus*, Is. Geoffr. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 138, pl. iv. fig. 4.

*Scincus cyprius*, Cuv. Règ. An. nouv. éd. ii. 1829, p. 62.

*Tiliqua cyprinus*, Gray, Syn. Griffith's An. Kingd. ix. 1831, p. 68.

*Eumeces pavimentatus*, Wieg. Herp. Mex. 1834, p. 36; Peters, Mon. Berl. Ak. 1864, p. 48; Blanford, East. Persia, Zool. ii. 1876, p. 387; Boettger, Zeitschr. ges. Nat. (Giebel) 1877, p. 288; Ber. Senck. nat. Ges. 1879-80, p. 183; Kessler, Trans. St. Petersburg Soc. of Nat. viii. 1878, Suppl. p. 177; Bedr. Bull. Soc. Nat. Moscou, 1879, no. 3, p. 27; Tristram, West. Palestine, Rept. & Batr. 1884, p. 152.

*Plestiodon aldrovandii*, part., Dum. & Bibr. v. 1839, p. 701; ? Guichenot, Explor. Sc. Alg., Sc. Phys. Zool. 1850, p. 17; A. Dum. Cat. Rept. Paris Mus. 1851, p. 164; De Filippi, Viagg. in Persia, 1865, p. 354; Steindachner, Unger & Kotschy's Insel Cyprien, 1865, p. 573; Gasco, Viagg. Egitto, pt. ii. 1876, p. 109; Lortet, Arch. Mus. Hist. Nat. Lyon, iii. 1883, p. 187.

*Euprepis princeps*, Eichw. Bull. Soc. Nat. Moscou, ii. 1839, p. 303; Faun. Casp.-Cauc. 1841, p. 93, pl. xvi. figs. 1-3.

*Plestiodon auratus*, Gray, Cat. Liz. B. M. 1845, p. 91; Günther, Proc. Zool. Soc. 1864, p. 489.

*Mabouia aurata*, Gthr. Rept. Brit. Ind. 1864, p. 82.

*Eumeces pavimentatus*, var. *syriaca*, Boettger, Abh. Senck. Ges. xiii. 1883, p. 120.

*Eumeces schneideri*, Blgr. Cat. Liz. B. M. iii. 1887, p. 383; Trans. Linn. Soc., Zool. v. 1889, p. 101;



EUMECES SCHNEIDERI.  
♂, Maryut district.





Fauna of Brit. India, Rept. & Batr. 1890, p. 219; Trans. Zool. Soc. xiii. 1891, p. 136; Boettger, Zool. Jahrb. iii. 1888, p. 918; Kat. Rept. Mus. Senck. 1893, p. 111; Anderson, Proc. Zool. Soc. 1892, p. 16; Herpet. Arabia & Egypt, 1896, p. 104; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 114; Peracca, Boll. Mus. Torino, ix. 1894, no. 167, p. 9.

*Plestiodon pavimentatus*, Lortet, Archiv. Mus. Hist. Nat. Lyon, iii. 1883, p. 187.

1 ♀. Marsa Matru, about 150 miles to west of Alexandria.

3 ♂ and 8 ♀. Maryut District.

Snout broadly pointed, short; its length equals the distance between the eye and the base of the ear-lobules; nasal generally divided, occasionally single, resting chiefly on the first labial, with its posterior lower angle on the second labial; no postnasal; supranasals broadly in contact behind the rostral; frontonasal occasionally divided, forming a broad suture with the second loreal; frontal as long as, or longer than, the interspace between itself and the front of the rostral; five supraoculars, rarely six, the first three in contact with the frontal; five to seven superciliaries; the interparietal completely separates the parietals; four or five pairs of nuchals; eight upper labials, occasionally nine, the sixth generally below the eye, rarely the seventh. Two zygotes postmentals. Ear large, with 3 or 4 prominent triangular lobules at its front margin. 22 to 28 (26 to 28 in Egypt) rows of perfectly smooth scales round the body, the scales of the two median dorsal series being each as broad as two of the lateral scales. The length of the fore limb is generally less than the distance between its humero-pectoral angle and the nostril, but it occasionally equals that distance; when laid forwards it usually reaches between the eye and the nostril, but occasionally only extends to the middle of the eye. The hind limb is much shorter than the interspace between the fore and hind limbs, and equals only about two-thirds of its extent, or even falls short of that. The tail may be considerably more than once and a half as long as the body and head.

The general colour of the upper surface is greenish olive with a brownish tinge, clearly defined off on the sides from the yellowish white of the underparts. The labials (month of April) are brilliant orange, with generally an olive-green spot on each, and this orange tint is prolonged backwards as a band through the lower half of the ear and along the sides of the neck and shoulders, and along the sides of the body. The sides of the neck below the orange, and the yellowish white of the sides of the body and of the tail are more or less spotted, or shortly feebly barred, with greenish olive or dusky olive, and, in adolescents, there are a few black spots on the sides and continued on to the tail. The entire upper surface, with the exception of the head, is spotted with brilliant reddish orange, the spots being arranged more or less in irregular longitudinal series or more or less irregularly transversely, especially on the neck and tail, where they sometimes form distinct transverse bands. Limbs pale olive-brown suffused with orange. Entire under surface yellowish white.

The largest male and female in my collection measure respectively from snout to vent 159 and 165 millim., but their tails are imperfect. A nearly adult male and female have the following dimensions:—

♂.	Snout to vent	155 mm.,	tail	224 mm.
♀.	„ „	163 „ „	„ „	254 „ „

I have met with this species—one of the most handsome of African lizards—in the semi-desert land to the west of Lake Mareotis, not far from the ruins of the country palace of Said Pasha, and known as the Maryut District. I first observed it among some heaps of stones on a slope of rising ground beside a field of stunted barley. It disappeared quickly among the stones, but with the aid of a pickaxe it was dug out, at no great depth, from a hole that had been tenanted by a snake that had recently cast its skin. All the specimens I obtained, about 12 in number, were captured within a radius of a few hundred yards from the foregoing spot, some of them in the loose sandy soil of the barley-fields.

I have opened the stomachs of three specimens. In one I found the remains of a large scorpion, and in the others the hard remains of beetles.

As far as I have been able to ascertain, it occurs only in the northern portion of the delta, and in the section of it immediately to the west of Alexandria. It is quite possible, however, that it may be found in other parts, on the outskirts of the delta, presenting similar conditions to those at Maryut.

One of my specimens came from Marsa Matru, 150 miles to the west of Alexandria, and, some years ago, a collector I sent from Tunis to Duirat, on the confines of the western frontier of Tripoli, brought back three specimens from that region. It has also been recorded by A. Duméril from the south-eastern portion of Algeria. From Egypt it ranges through Palestine, Syria, Turkish Armenia, to the Trans-Caspian (Kopet-dagh), Persia, and Baluchistan.

In Lower Egypt, it varies but little, but the lobulation of the ear becomes more or less modified in some. In Syrian specimens the body is much thinner in some than in others, and these correspond to the lizard described by Is. Geoffr. St.-Hilaire as *S. pavimentatus*, figured, pl. iv. fig. 4, in the 'Descr. de l'Égypte,' and therefore presumably from Egypt. I have never met with lizards of this somewhat attenuated type, and I am not aware that they have ever been found in Egypt since the publication of the great French work. In Syria, however, such forms do occur, and if they are present in Egypt they should be sought for on the eastern side of the delta, towards Tel el Kebir. Professor Boettger has described these Syrian forms and their colour-variations, which he is disposed to attribute to changes that take place in the lizards between the young and adult conditions. As all my specimens of what may be regarded as the typical form are adult, they throw no light on this subject.

In some of the Syrian examples of this species, a remarkable simulation, so to speak,

is met with of the coloration so characteristic of *Chalcides ocellatus*. So much does it conform to the latter that individuals presenting it might at first sight be mistaken for that species.

Six out of 8 Egyptian specimens have 26 rows of scales round the middle of the body, and two have 28. These two numbers prevail in Persian examples of the species, whereas in the Syrian forms only 24 rows of scales occur.

It is known to the Arabs as اُمُّ حَيَّات = *umm el haiyât*, "the mother of serpents," and also as رَضَاعَةُ الْبَقَرِ = *raddâ'at el bakar*, the "milker of cattle;" but, according to Sonnini, a similar myth to this exists regarding *Varanus niloticus*.

## SCINCOPUS.

*Scincopus*, Peters, Mon. Berl. Ak. 1864, p. 45.

Limbs well developed, but rather short; digits 5—5, subcylindrical, slightly laterally compressed, with transverse lamellæ below, not serrated laterally. Tail short, conical. Nostril lateral, between an anterior and posterior nasal; eyelids well developed, scaly; ear-orifice covered by two large scutes in the form of opercula; postnasals, supranasals, præfrontals, frontoparietals, and interparietals present. Dorsal scales large, grooved, finely striated, enlarged in the middle line of the back. Palatine bones not in contact in the middle line of the palate; pterygoids toothed; lateral teeth conical.

I have examined the type of this genus and species preserved in the Berlin Museum. It was presented by Strauch, and in addition to the name *Scincopus fasciatus*, Peters, it bears the name *Otolepis brandtii*, Strauch. The locality whence it was obtained was Geryville, on the confines of the Algerian Sahara. I have also been privileged to see the specimen in the Paris Museum from Tunisia.

The lizard preserved in the Berlin Museum, to which Peters gave the name *Scincopus fasciatus*, agrees in all its essential characters with the Suakin specimens, and, like some of them, it has 24 rows of scales round the body. The Paris individual, on the other hand, presents some differences which are due, however, not to any specific diversity between it and the Suakin lizards, but to abnormal division of some of the head-shields. Thus there is an azygos præfrontal separating the præfrontals proper, and there are three loreals instead of two, the third loreal being produced by longitudinal division of the anterior loreal, so that two loreals instead of one lie behind the nostril. The second, third, and fourth supraoculars are in contact with the frontal, and on one side the first as well.

The form of the head of this lizard resembles that of the members of the genus *Eumeces* and not that of *Scincus*. The moderately pointed snout arches gently upwards to the vertex and is quite distinct from the flattened digging snout of the latter genus. Its digits, moreover, are structurally different from those of *Scincus*, in which both the fingers and toes are much flattened from above downwards, so that their cross-section is an elongated oval, transverse in position, while the digits of *Scincopus* are slightly laterally compressed, and thus in transverse section present a vertical oval. In *Scincus*, the digits are covered below by a series of transverse lamellæ acutely bent round their inner edges, so that the lamellæ appear more or less on the upper surface of the digits; and their dorsal aspects are clad with a series of transverse scales, the external edges of which form a lateral fringe more developed in the *pes* than in the *manus*<sup>1</sup>. In *Scincopus*, on the other

<sup>1</sup> See p. 204 for a description of the digits of *Scincus*.



SCINCOPUS FASCIATUS.  
♂, Suakin.





hand, the digits are covered with four rows of scales, a dorsal, a ventral, and a lateral for each side, with no trace of denticulation or fringing, the digits being essentially like those of *Eumeces*. It is thus evident that in its feet, as in its general form and non-angulated body, the nearest ally of this genus is *Eumeces*. The detail in which it shows an affinity with *Scincus* is in the form of the labials, for, as in that genus, the upper labials are first slightly directed outwards and then inwards, while the lower labials manifest an intensification of the ridge that occurs in *Scincus*. In all the forms referable to *Scincus* the body has a ridge running along the sides, and the scales are perfectly smooth and almost glassy in their polished surfaces, whereas, in *Scincopus*, the sides of the body are round and the scales are grooved and show fine, irregular ridges.

SCINCOPUS FASCIATUS, Peters. (Plate XXVI.)

*Scincus officinalis*, part., Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 41.

*Scincus* (*Scincopus*) *fasciatus*, Peters, Mon. Berl. Ak. 1864, p. 45.

*Cyclodus brandtii*, Strauch, Bull. Ac. St. Pétersb. x. 1866, p. 459.

*Scincus fasciatus*, Blgr. Cat. Liz. B. M. iii. 1887, p. 390; Trans. Zool. Soc. xiii. 1891, p. 137.

*Scincopus fasciatus*, Anderson, Herpet. Arabia & Egypt, 1896, p. 104.

1 ♀. Suakin. Colonel Sir Charles Holled Smith, C.B., K.C.M.G.

3 ♂, 4 ♀, and 1 juv. Suakin. Surgeon-Captain R. H. Penton, D.S.O.

2 ♂. Suakin.

Head shortly pyramidal, swollen in the temporal region, but longer than broad; snout obtusely truncate; loreal region concave; lower labials with a ridge along their middle, the intervening space between the ridge and the lower border of the upper labials concave. Ear-opening large, near the commissure of the mouth, covered by two large opercula. Rostral considerably broader than high, convex from above downwards, and from side to side, and without a trenchant margin; supranasals broadly in contact with the rostral; frontonasal rather small, hexagonal, broader behind than in front, its anterior breadth less than, and its posterior breadth greater than its length; frontal slightly longer than the conjoint præfrontals, frontonasal, and supranasals, its lateral margins slightly concave and its posterior equalling two-thirds of its anterior breadth; six supraoculars, the second and third in contact with the frontal; four or five superciliaries; interparietal somewhat longer than the frontoparietals and generally separating the parietals posteriorly, rarely merged in the surrounding shields; generally four pairs of nuchals, sometimes amalgamated with the parietals. Two or three loreals, the first higher than long, in contact with the frontonasal, supranasal, posterior nasal, second and third labials, second loreal, and præfrontal; the second considerably longer than high, in contact with the præfrontal,

second loreal, third and fourth labials, anterior subocular, and first supraocular; six or seven very low infraorbitals; one postorbital; temporals 1+2. Generally eight upper labials, rarely 9 or 10; lower labials usually 8, rarely 7; the sixth upper labial usually below the middle of the eye, rarely the fifth or seventh; two azygos postmentals, with a pair of large shields behind them followed by 3 or 4 large shields, one behind the other, separated from those of the opposite side by a longitudinal line of smaller shields. Body surrounded by 22-26 rows of scales, those on the middle of the back nearly thrice as large as the largest ventral scales; each scale on the upper surface of the body with either two or three grooves running along it longitudinally, with the rest of its surface covered more or less with fine irregular raised lines and depressions; these markings are all but obliterated on the scales on the side, and nearly disappear on the under surface, but they are generally present more or less on the throat in adults. Two large anal shields, larger than the parietals. Limbs well developed, but short; the fore limb, when laid forward, may reach the middle of the eye or may extend beyond the eye; digits moderately short; upper surface of the manus covered at the base of the digits with five longitudinal rows of scales, one to each digit, the row corresponding to the fourth finger being the broadest; but in the pes there are 8 such rows, an additional row being interpolated between each digit from the first to the fourth; ungual scute moderately large; claws compressed, curved. Tail short, broad at the base, depressed, afterwards slightly laterally compressed, rounded above and below.

Colour of the upper surface of the animal pale orange-yellow or greyish yellow; the head from the snout to the vertex, and along its sides to the ear inclusive, generally deep bluish black, but the lower half of the rostral and most of the anterior upper labials yellowish white; six or seven broad transverse bands of the same colour across the back, the first on the neck (sometimes absent), the second behind the shoulder, the third on the middle of the body, the fourth on the loins, and three on the tail, the terminal one generally the broadest; these black dorsal bars are sometimes almost wanting, being only represented by a few black blotches or faint blackish margins to the scales in the regions generally occupied by them, but the black tip to the tail is always indicated; sides and underparts yellowish white or nearly white.

The following table shows that there is very little variation in the number of labials. Professor Peters recorded 9 and 10 upper labials in his specimen, but he probably regarded as a labial the scale that intervenes between the lower scale of the operculum of the ear and the very large scale that I regard as the last labial. The tabulated measurements reveal some trifling variations in the sizes of the parts recorded. The type from Geryville had 24 rows of scales round the body, and the one in Paris from Tunisia had 26, the highest recorded number.

I kept an example of this lizard under observation for three weeks, but during that time it refused to eat, although it was offered a great variety of insects and

*Measurements &c. of some Examples of S. fasciatus, Peters (in millim.).*

Sex.	Snout to vent.	Tail.	Length of head.	Width of head.	Upper and lower labials.	Labial below middle of orbit.	Long axis of eye.	Length of fore limb posteriorly.	Axilla to groin.	Length of hind limb posteriorly.	Scales round body.	Locality.
	89	56	23	17	L. $\frac{8}{8}$ , R. $\frac{8}{8}$	6	5	28	42	31.5	22	Suakin.
♀ ....	92	..	24	17.6	$\frac{8}{8}$ $\frac{8}{8}$	6	5	29.3	45	31.3	24	"
♂ ....	122	82	32	23.3	$\frac{9}{8}$ $\frac{8}{8}$	L. 7, R. 6	6	37.5	57	41.3	22	"
♀ ....	124	80	30	23	$\frac{8}{8}$ $\frac{8}{8}$	6	6	37	67	39.5	24	"
♀ ....	136	67	32	23.5	$\frac{8}{8}$ $\frac{8}{8}$	6	6	40	68	43	22	"
♂ ....	138	74	33	24.5	$\frac{8}{8}$ $\frac{8}{8}$	6	6	40	71	43	22	"
	139	73	35	27	$\frac{8}{8}$ $\frac{8}{8}$	6	6.5	42	71	44.5	22	"
♂ ....	144	60	35	27	$\frac{9}{8}$ $\frac{9}{8}$	7	6.5	42	71	42.5	24	"
♀ ....	144	85	35	26	$\frac{8}{8}$ $\frac{8}{7}$	6	7	43	75	45.5	22	"
♂ ....	148	68	37	28	$\frac{9}{8}$ $\frac{8}{8}$	L. 7, R. 6	7	44	81	48.5	24	"
	157	56	36	26	$\frac{8}{8}$ $\frac{8}{8}$	6	7	41.5	77	45	22	"

small pieces of animal food. The stomach is provided with stronger muscular walls than is generally met with in insectivorous lizards; and associated with this we find that this species is in the habit of swallowing sand, and even small pebbles and other hard substances with its food, which largely consists of beetles. I removed, from the stomach of one, a pebble 15 millim. long by 2 millim. broad, and also the hard branched stem of a plant 22 millim. long and 13 in expanse.

I much regret that I did not carefully examine the nature of the lizard's pupil in life, as when I came to look at it in alcoholic specimens it appeared to be more or less vertical, thus implying a nocturnal habit.

Until the foregoing specimens were obtained at Suakin, only four examples of the species existed in the Museums of Europe. Besides the type, described by Peters and preserved in the Berlin Museum, another, in the Paris Museum, was picked up dead, but in a dried condition, by M. Lataste, on a plain to the south of Gabes, in Tunisia; a third was captured at Khartum, while the fourth, the locality of which is unknown, exists in the Museum of St. Petersburg. The species has thus a wide range over Northern Africa.

It is known to the Hadendowahs as the *Gull-gull*.

## SCINCUS.

*Scincus, part.*, Laur. Syn. Rept. 1768, p. 55.

Sides of the body more or less angular; limbs well developed; digits 5—5, flattened from above downwards, with transverse lamellæ below; a strong lateral fringe formed by the scales of the upper surface of the digits; tail thick at its base, conical; snout cuneiform, with a sharp labial edge; nostril between an upper and lower nasal; lower eyelid scaly; ear-opening more or less covered by two or more small fringed scales, or entirely hidden by the scales; supranasals, præfrontals, frontoparietals, and interparietal present; dorsal scales smooth or striated. Palatine bones not in contact in the middle line of the palate; pterygoids toothed; lateral teeth conical.

The following arrangement of scales prevails on the digits of *S. officinalis*, Laur.:—On the fore foot the first and second digits have a series of inferior lamellæ, a superior longitudinal series, and a series of very small scales along the external border. In all the other digits of the manus only the superior series of scales and the lamellar scales of the under surface are present. The inferior lamellæ on the first four digits of the *manus* are acutely bent upwards and appear on the dorsal surface of the internal border, but on the fifth this arrangement is reversed, as the inferior lamellæ appear on the upper surface of the external border. In the first to the fourth digit the fringe is formed by the projecting anterior angle of the external free margin of the dorsal plate, while in the fifth digit it is formed by the inner border of the dorsal plates and is thus internal, but in this finger the external angles of the inferior plates form a distinct denticulated border. The two large plates over the claws of the fifth finger have their position the exact reverse of the other fingers. In all the digits of the *pes* the fringe is external, and their inner margins are also all more or less denticulated, very feebly in the first, more strongly in the second, and most so in the fifth. This structure of the digits is thus very different from the simple digit of *Scincopus* and *Eumeces*.

It seems impossible to distinguish the sexes of this species by the characters of the base of the tail, as can be done generally among other lizards, in which the base of the tail is swollen in the male and not in the female. A female before me has the base of the tail absolutely more swollen than it is in a larger male. Both of these specimens were sexed by inspection of the internal generative organs. The female, however, as in the great majority of lizards, is distinguished by a more graceful form than the male, and by a smaller and more delicately formed head. Both males and females alike have an enlarged ridge-like scale on the posterior border of the cloacal opening.





SCINCUS OFFICINALIS.

♂ & juv., Sandy Desert, Gizeh.



## SCINCUS OFFICINALIS, Laur. (Plate XXVII.)

*El Adda*, Bruce, Travels to Discover Sources of Nile, 1790, App. pp. 193-198, pl. 2. fig. 2.

*Lacerta scincus*, Hasselq. Act. Soc. Reg. Sc. Upsal. 1751, pp. 30-33.

*Lacerta stincus*, Hasselq. & Linn. Iter Palæst. 1757, p. 309; Linn. Syst. Nat. 12th ed. 1766, p. 365.

*Scincus officinalis*, Laurenti, Syn. Rept. 1768, p. 55; Schneider, Hist. Amph. ii. 1801, p. 174; *part.*, Daudin, Hist. Rept. iv. 1802, p. 228; Merr. Syst. Amph. 1820, p. 73; Fitz. Neue Class. Rept. 1826, p. 52; Aud. Descr. de l'Égypte, Hist. Nat. i. ? 1829, p. 178, Suppl. pl. 2. figs. 8.1 to 8.3; Cuvier, Règ. An. nouv. éd. ii. 1829, p. 62; Gray, Syn. Griffith's An. King. ix. 1831, p. 67; Brandt u. Ratzeburg, Med. Zool. 1827-34, p. 166; Wiegman, Arch. f. Nat. 1837, p. 127; Dum. & Bibr. v. 1839, p. 564; Duvernoy, Cuv. Règ. An., Rept. pl. xxii. fig. 1; Gray, Cat. Liz. B. M. 1845, p. 74; Rüppell, Mus. Senck. iii. 1845, p. 304; Gervais, Ann. Sc. Nat. (3) x. 1848, p. 204; Gravenh. Nov. Acta Ac. Leop.-Carol. xxiii. 1, 1851, p. 313, pl. xxxi.; Tristram, Proc. Zool. Soc. 1859, p. 475; *part.*, Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 41; Boettger, Ber. Senck. nat. Ges. 1879-80, p. 183; Peters, Mon. Berl. Ak. 1880, p. 308; Blgr. Cat. Liz. B. M. iii. 1887, p. 391; Trans. Zool. Soc. xiii. 1891, p. 137; Pfeffer, Jahrb. Hamb. Wissensch. Aust. vi. 1889, p. 8; op. cit. x. 1893, p. 7; Anderson, Proc. Zool. Soc. 1892, p. 16; Herpet. Arabia & Egypt, 1896, p. 105; König, Verh. (S.B.) nat. Ver. Bonn, 1892, p. 21; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 114; Werner, Verh. zool.-bot. Ges. Wien, 1895, xlv. p. 83; Francaviglia, Boll. Soc. Rom. Stud. Zool. v. fasc. i. & ii. 1896, p. 44.

*Lacerta edda*, Donndorff, Zool. Beytr. 1798, p. 134.

1 ♂, 5 ♀, and 3 juv. Sandy desert, Pyramids of Gizeh.

6. Sandy desert, Pyramids of Gizeh.

Snout rather long and wedge-shaped; eye small; ear a short way behind the angle of the mouth, small and protected by two or three scales with fringed margins; nostril placed on the canthus rostralis, which is rounded off into the concave loreal region; a postnasal; seven upper labials; rostral large and in contact by a fine point with the frontonasal, which is hexagonal; frontal slightly contracted antero-posteriorly and in contact with the second and third supraoculars, of which there are six; parietals small, shorter than the interparietal, with four or five nuchals behind them. Twenty-six to twenty-eight scales, rarely thirty, round the body, perfectly smooth, those on the middle of the back slightly larger than the largest scales on the under surface. Limbs short and stout; the digits strongly fringed; ungual phalanges with large scutes; claws rather narrow and long. Tail considerably shorter than the body and head, thick and cylindrical at its base, but more or less laterally compressed towards its tip.

General colour pale but rich yellowish, with usually ten brown or pale yellowish-brown broad cross-bars from the occiput to the sacral region, with a varying number continued on to the tail. Each dorsal scale with two or three short, white, longitudinal streaks or shafts. Under surface yellowish white. In the young there are seemingly

no brown bars across the back, but only short dusky areas corresponding to their position occur along the sides; each scale is finely margined with brownish, but no white streaks are present.

Measurements of the largest male from Gizeh:—Snout to vent 112 millim., tail 67 millim.

It attains, however, to a considerably greater size, one example in the British Museum measures as follows:—Snout to vent 147 millim., tail 77 millim.

This well-known lizard is not at all uncommon in the desert about the Pyramids of Gizeh, but it occurs only in the accumulations of drift-sand. I have on a number of occasions let individuals loose to watch their movements and without any fear of losing them, as when once the lizard is covered with the sand its movements are neither so quick nor does it go so deep that it cannot be recaptured with ease, if it is carefully watched. When let loose it runs a few paces and then begins to hide itself by first thrusting its sharp wedge-shaped snout into the sand with its hind limbs laid backwards against the tail; and when the body is wriggled under up to the hind limbs, it uses these members and a spiral movement of the tail to complete its disappearance. The method by which it propels itself into the loose sand and the ease with which it is accomplished forcibly remind one of an act of swimming, and hence it has well earned the name "fish of the sand." It has been described in a number of old works devoted to fish.

Lefebvre collected a number of individuals of this scink during an excursion he made into the oasis of Baharieh, in 1828. He found them on hillocks of fine light sand accumulated by the south wind at the base of the hedges and tamarisks that border the cultivated land, on the confines of the desert. In such situations, he observed the scink sunning itself, but running from time to time after insects (Coleoptera) that might pass within its reach. He says that in a few instants it would penetrate the sand to the depth of many feet, and that it made no attempt to bite or scratch with its claws when captured, although it made efforts to escape.

The Bedouins recognize its trail on the sands and dig it out very dexterously with their hands, and any I have seen captured were never more than a few inches, twelve at the most, below the surface.

It has been recorded from the Algerian Sahara close to the frontier of Morocco, and as Rohlf's and Stecker obtained it on their way to the oasis of Kufra, to the south of Tripoli, and Bruce in the Atbara valley, it may be said to be distributed over the Sahara. It may possibly extend with the sand-drifts to the east of the Isthmus of Suez, but that it occurs in Syria proper seems very improbable, considering its habits. It has not yet been observed in Arabia, in which five out of the seven members of the genus occur. The remaining species, *S. arenarius*, which is the most closely allied of all to *S. officinalis*, is found in Sind, whereas *S. hemprichii* inhabits the opposite coast of the Straits of Bab-el-Mandeb.

The members of the French Expedition did not meet with this species in Lower Egypt. No notice of it occurs in M. Is. Geoffroy's part of the work, and, in Audouin's section, only Daudin's description of it is quoted. Moreover, M. Is. Geoffroy himself, in a note to De Sacy's translation of Abd-Allatif's work, states that it is not found in Lower Egypt, and that it is rare in Upper Egypt. My experience has been quite the reverse. He adds, moreover, that it was brought to Cairo by the caravans from Abyssinia; but the scink they carried was in all likelihood *S. hemprichii* and not *S. officinalis*, which does not occur in Abyssinia proper, whereas the former does. The similarity of the Arabian scinks to the true officinal scink of Egypt doubtless led the latter to be erroneously regarded as an inhabitant of that part of Asia.

Bruce figures *Scincus officinalis* and states that it is a native of Atbara "beyond the rains," and that it seemed well known to the different black inhabitants who came from the westwards by the great caravan which, in his day, was called the caravan of the Sudan. The term *el adda* given by Bruce to this lizard I have never heard used in Egypt. On showing it to some Bedouins in my employment they called it *sakankur*, the name applied by some old Arab writers to their scink, which was one or other of the two *Varani* found in Lower Egypt, and I observe that Sir J. Gardner Wilkinson (unpublished drawings) also gives *sakankoor* as the Arab name of *Scincus officinalis*. De Sacy conjectures that the term  $\text{إدھا}$  = *idha* or *adhayèh*, the *el adda* of Bruce, was properly applicable to *Chalcides ocellatus*, Forskål, and he mentions that Damiri, quoted by Bochart, states positively that lizards so called bore in Egypt the name  $\text{سحلية}$  = *sihliya*, the native term correctly applied to it by Forskål. As already mentioned, Prospero Alpini pointed out that the scink of his day (1553-1617) was not the lizard known to the ancients as *Scincus*. Avicenna (980-1037) says that the *saganqur* is a lizard found in the Nile, a statement repeated by Abd-Allatif and by some Arab authors.

Avicenna gives two or more receipts for the preparation of an electuary of *Scincus*, which in Southeimer's translation is identified with *Scincus officinalis*. Preparations of the latter lizard are still in use in Africa and Asia, and, not many years ago, I saw some dried specimens of a *Scincus* that had been imported into India. The only treatment to which they had been subjected was evisceration and drying, doubtless in the sun. This lizard once held a place in the British Pharmacopœia on account of its supposed alexipharmic properties, and it entered into the compound preparations known as "*Theriaca Andromache*" and "*Confectio Damocratis*." Pliny extolled its virtues as a specific for the wounds caused by poisoned arrows. Among the Arabs it was in high repute as a remedy for reanimating the powers exhausted by age or by debauchery, and in eastern countries fables are still extant regarding its potency in this respect.



## CHALCIDES.

*Chalcides*, part., Laur. Syn. Rept. 1768, p. 64.

Body much elongate, rounded or angular. Limbs short or rudimentary; digits 5—5 to 1—1; nostrils formed by an emargination of the rostral and by a small nasal; supranasals present. Eye well developed or small; lower eyelid with an undivided transparent disk. Ear open, nearly hidden by the scales or fringed. Præfrontals and frontoparietals absent. Palatine bones separated on the mesial line of the palate. Palate toothless. Teeth conical.

Mr. Boulenger has grouped under the genus *Chalcides* a number of species of lizards evidently generically identical, but still manifesting among themselves certain modifications in the form of the head, length and character of the body, degree of development of the ear, eye, and limbs, that are full of interest.

In their habits of life they belong to two sections, one living among and under stones and amid herbage, and the other burrowing amid loose sand. The first of these sections contains the following species, viz.: *C. ocellatus*, *C. viridanus*, *C. bedriagæ*, *C. lineatus*, *C. tridactylus*, *C. guentheri*, *C. mionecton*, and *C. mauritanicus*; and the second *C. sphenopsiformis*, *C. delislîi*, *C. sepoides*, and *C. boulengeri*.

There can be no doubt of the intimate relation subsisting between *C. ocellatus*, *C. viridanus*, and *C. bedriagæ*, as they have all similarly formed heads, large ear-orifices, moderately elongate rounded bodies, and almost equally developed pentadactyle limbs. The three species, *C. lineatus*, *C. tridactylus*, and *C. guentheri*, on the other hand, while they have similarly formed heads and large ear-openings like the previous group, have much more elongate and serpentine bodies, but still round, whilst they usually possess more feeble tridactyle limbs, reduced in the most specialized form, *C. guentheri*, to seemingly functionless knobs.

From the structural features of these lizards, it is evident that they are in no sense burrowers. Their conical snouts, widely open ears, and relatively weak limbs are not suited to such a habit.

In the third group, the members of which live in loose sand and whose bodies are specially adapted for such a life—viz.: *C. sphenopsiformis*, *C. delislîi*, *C. sepoides*, and *C. boulengeri*—the head is modified, as the canthus rostralis disappears, the snout becomes wedge-shaped and projects beyond the labial margin as a sharp edge, and is thus well adapted for being driven into the loose sand, like the snout of *Scincus*. The eye becomes reduced in size, and also the ear, which is either almost hidden by the neck-scales or protected by a fringe of scales. The outline of the body also is modified, as it is angular at the sides. The limbs in all are weak, but more especially the fore limb. In one the fore limb is didactyle (*Anisotermia*, A. Dum.), in another tridactyle (*Allodactylus*, Lataste), and in other two tetra- or

pentadactyle (*Sphærops*, Wagler); the hind limb in all is generally tetradactyle, and in one species occasionally pentadactyle.

The two species grouped along with *C. ocellatus* conform, more or less, to its type of coloration; whereas in the second group lineation of the body is the characteristic feature, a type of coloration which is also present in the third, but associated with a pale body colour, in keeping with the sand in which the lizards live.

The lizard described by Professor Boettger from West Africa under the name of *Seps* (*Gongyloseps*) *mionecton*, manifests a perceptible tendency, in the more rounded character of the canthus rostralis and in the greater flattening of the symphysis of the lower jaw, to lead into the third group. The ear also is open, but smaller than in *C. bedriagæ*, to which it is closely allied, and from which it differs in having more degraded limbs and in some other characters. Its body is more elongate than in *C. viridanus*, and slightly more so than in *C. bedriagæ*. Its colour is almost exactly similar to that of the latter, and retains like it the undoubted equivalents of the ocellation of *C. ocellatus*, but restricted chiefly to the brown area occupying the middle of the back and to the tail. *C. mionecton* leads not only to the third group, but also somewhat towards *C. tridactylus*. The great gaps, however, that exist between the species may eventually be more or less filled up by intermediate forms, when the region of Africa to the south and east of Morocco becomes known. The condition of the ear of *C. mionecton* is of considerable interest, as the upper scales of the orifice tend to form a fringe over it, but it is no more than the beginning of a divergence from the type of ear characteristic of the first and second groups towards that distinctive of the third group, and most accentuated in the fringed ear of *C. sepoïdes*. In *C. delislîi* and *C. sphenopsiformis* the ear is more hidden, as the scales all but wholly cover it, but they are not modified into a fringe as in *C. sepoïdes* and *C. boulengeri*.

The form *C. mauritanicus*, Dum. & Bibr., is closely allied to *C. mionecton*, as the body is round and has about the same degree of elongation, and much the same colour. The head has the form of the head of *C. viridanus*, but the limbs are even more degraded than in *C. mionecton*, and there are only two digits anteriorly and three on the hind limb. The ear is almost entirely covered by the scales. There are only 10 rows of scales round the body, which is the smallest known number in this genus of skinks. It is doubtless an offshoot from *C. mionecton*, like the other small sand-lizards, such as *C. boulengeri* and *C. sepoïdes* on the one hand, and *C. delislîi* and *C. sphenopsiformis* on the other; whereas the large-eared skinks of this genus, viz. *C. lineatus*, *C. tridactylus*<sup>1</sup>, and *C. guentheri*, are in all likelihood offshoots from an ancestor allied to *C. bedriagæ*, and from which *C. viridanus* and *C. ocellatus* also probably sprang.

<sup>1</sup> CHALCIDES TRIDACTYLUS, LAUR.

*Chalcides tridactyla*, Laur. Syn. Rept. 1768, p. 64.

*Chalcides tridactylus*, Blgr. Cat. Liz. B. M. iii. 1887, p. 403.

A skink has been recorded from the neighbourhood of Alexandria by Prof. Gasco\* under this name. In

\* Viagg. in Egitto, pt. ii. 1876, p. 109.

## CHALCIDES OCELLATUS, Forskål. (Plate XXVIII. fig. 1.)

*Lacerta ocellata*, Forskål, Descr. An. &c. 1775, p. viii et p. 13; Aud. Descr. de l'Égypte, Hist.

Nat. i. ? 1829, p. 73, Suppl. pl. ii. figs. 71-73.

*Lacerta (Stincus) ocellata*, Donndorff, Zool. Beytr. iii. 1798, p. 126.

*Lacerta tiligugu*, Gm. Syst. Nat. Linn. i. pt. iii. 1788, p. 1073.

? *Scincus ocellatus*, Schneider, Hist. Amph. ii. 1801, p. 203.

*Scincus variegatus*, id. l. c. p. 185.

*Scincus ocellatus*, Meyer, Syn. Rept. 1795, p. 30; Daud. Rept. iv. 1802, p. 308, pl. lvi. ?; Merr. Syst.

Amph. 1820, p. 74; Is. Geoffr. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 139, pl. v. fig. 1; Gervais, Ann. Sc. Nat. sér. 2, vi. 1836, p. 309.

? *Scincus mabouya*, Daud. Rept. iv. 1802, p. 246; Oppell, Ord. Fam. Gatt. Rept. 1811, p. 39.

*Scincus tiligugu*, Latr. Hist. Nat. Rept. ii. p. 72; Daud. Rept. iv. 1802, p. 251; Merr. Syst. Amph. 1820, p. 73.

*Stincus ocellatus*, Oliv. Voy. Emp. Othom. &c. iii. livr. 1, 1801, p. vi, pl. 16. fig. 1.

*Scincus tirus*, Rafin. Caratt. alc. n. Gen. Anim. 1810, p. 9.

*Scincus thyro*, Metaxa, Mem. Zool. Roman. 1821, art. 1, spec. 16, fig.

*Mabuya ocellata*, Fitz. N. Class. Rept. 1826, p. 53.

*Tiliqua ocellata*, Cuv. Rêg. An. nouv. éd. 1829, ii. p. 63.

*Gongylus ocellatus*, Wagler, Syst. Amph. 1830, p. 162; Bonap. Faun. Ital. 1832-41, p. et pl. without no.; D. & B. iv. 1839, p. 616; Gené, Mem. Accad. Torino, ser. 2, i. 1839, p. 268; part., Gray, Cat. Liz. B. M. 1845, p. 123; Lefebvre, Voy. Abyss. vi., Zool. 1845-50, p. 206; Guichenot, Explor. Sc. Algér., Sc. Phys., Zool. v. 1850, p. 17; Dum. Cat. Rept. Paris Mus. 1851, p. 155; Gravenh. N. Acta Ac. Leop.-Carol. xxiii. 1851, i. p. 343; Peters, Mon. Berl. Ak. 1862, p. 272; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 43; Günther,

one of Sir J. Gardner Wilkinson's books of drawings, professedly of Egyptian objects\*, there is a figure of *C. tridactylus* under the name of *el bergil*, but with no information as to the locality whence it was obtained. The drawing is simply marked *Seps*.

The late Dr. Grant, of Cairo, informed me that while digging among some ruins in the Fayum, many years ago, he unearthed a long snake-like lizard, which, from the conditions under which it was found and the description he gave of it, might possibly be this species. The specimen was sent by Dr. Grant to Professor Owen for identification, but he had no reply to his enquires regarding it.

I have mentioned elsewhere† that a specimen of this species exists in the Cairo Museum, but unfortunately unaccompanied by any information as to its origin.

The evidence as to its existence in Lower Egypt is thus not sufficiently conclusive to entitle it to more than this passing reference.

Its conical snout, long rounded body, and weak tridactyle limbs enable it to be easily recognized.

\* I am indebted to Sir W. Flower for having shown me the volume.

† Herp. Arabia & Egypt, 1896, p. 113.



CHALCIDES OCELLATUS. Fig. 1, Luxor.

CHALCIDES SEPIOIDES. Fig. 2, Sandy Desert, Gizeh.  
CHALCIDES DELISII. Fig. 3, Suakin Plain.





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2. Marsa Matru.
2. Maryut District.

4. Alexandria.
5. Oasis of Siwah. A. R. Birdwood, Esq.
2. Ramleh.
2. Beltim. Dr. J. G. Rogers.
4. Mahallet el Kebír, Delta. G. H. Kent, Esq.
5. Cairo. Dr. Walter Innes.
7. Gizeh.
4. Fayum.
7. Luxor.
1. Oasis of Khargeh. Professor Ernest Sickenberger.
1. Berys, south of Oasis of Khargeh. Major H. G. Lyons, R.E.
1. Assuan.
3. Philæ.
2. Wádí Halfa.
4. Durrur.
7. Suakin.
2. Tokar.

Snout obtuse, projecting very slightly, if at all, beyond the labial margin; eye moderately developed; ear-opening more or less triangular, moderately large, and placed some distance behind the commissure of the mouth. Nostril small, over the suture between the rostral and first labial; supranasals in contact behind the rostral, their length about one half of their breadth; nasal small, crescentic, with a postnasal behind it in contact with the supranasal, first loreal, and first and second labial, rarely with the second only; frontonasal broader than long, in contact with supranasals, first loreal, first supraorbital and frontal; frontal nearly as broad as long; generally 8 upper labials, rarely 7 or 9, the fifth usually under the eye, the last the smallest. Sides of body rounded; 24-40 scales round the body (usually 26-32 in Egypt), smooth or feebly striated. Limbs short, but well developed; digits 5-5. The length of the fore limb is less, sometimes considerably so, than the distance between the axilla and the eye; the hind limb is generally shorter than the interspace between the axilla and the tip of the snout. Tail variable, generally longer than the head and body.

Coloration variable, but generally the upper surface is brown or olive-brown, occasionally greyish, marked by narrow transverse black bands about the breadth of a scale, and not unfrequently broken up into closely opposed spots, each with a longitudinally narrow white spot or shaft. In others the black and white spots of the back may entirely disappear, or if present be small and feebly developed, and in such cases there is generally a light-coloured stripe down each side of the lizard, thus defining a brown dorsal band. In some, the spots are absent on the body but present on the sacral region, on the tail, and on the hind limbs.

The largest specimen in my collection from Egypt measures as follows:—Snout to vent 122 millim., tail 84 millim.

This species is found all over Egypt, except in the utterly sterile desert, and my specimens came from the alluvium, the margin of the desert, and from the oases. It is one of the most prevalent lizards, being found not only in the open country, but in the towns and villages.

It has a wide range over Northern Africa, that may be defined as lying to the north of a line drawn from the mouth of the Juba river in Somaliland, to Cape Jubi, on the Atlantic coast, in El Gada, opposite to the Canary Islands. It is also found over a limited portion of Southern Europe, comprising Southern Italy, Sardinia, Sicily, Greece, Cyprus, and the islands of Malta, Lampedusa, Cyprus, Chios, Rhodes, Limosa, &c. In Asia, it occurs in Arabia, Syria, Persia, and Sind.

It is known as <sup>سحلية</sup> *sihliya*<sup>1</sup>.

In the extreme eastern limit of the distribution of this species, lizards are met with at Assab, in Eritrea, in which the black and white spots of the back are either present or entirely disappear; they are always, however, more or less preserved on the sacral region, hind limbs, and tail. There is, besides, an indication of the pale dorso-lateral band, which is also present in the large variety *tiligugu*, and also not unfrequently in *forma typica* itself. These lizards have only 24 rows of scales round the body, whereas in *tiligugu* the scales vary from 28 to 34, and in *forma typica* from 28 to 32. This Eritrean variety, with a low lepidosis, is of small size, and has been indicated by Mr. Boulenger as *ragazzii*. Professor Boettger and Mr. Boulenger have pointed out, however, the occurrence in the same region of lizards conforming in their essential characters to the typical form. Other lizards are also found in Eritrea with 26 to 28 rows of scales in which the ocellated spots, although present all over the back, are small and feebly marked, and in which a light stripe extends along each side. Mr. Boulenger regards them as intermediate between the typical form and var. *ragazzii*, and has proposed for them the name *humilis*. He says, "they agree with the var. *ragazzii* in the small size, the largest measuring only 96 millim. from snout to vent."

At Tokar and Suakin, lizards similar to those described as var. *humilis* occur, and in the latter locality associated with others as pronouncedly spotted as *forma typica*, and with their scales varying from 28 to 30. At Durrur, about 50 miles to the north of Suakin, lizards conforming to the coloration and general characters of *forma typica* have 28 rows of scales, but one specimen differs from them in having the spots less numerous and more scattered, and in it the number of scales is 26. These Durrur specimens show indications of a pale lateral line, as in the Eritrean lizards, and one of them, with 26 scales round the body, is 115 millim. from snout to vent—the largest lizard of this species from the delta, with 30 scales, being 106 millim.; others at Suakin, with 28 scales, measure 119 millim.; so that the dimensions of var. *humilis* equal those of *forma typica*.

<sup>1</sup> *Vide supra*, page 207.

At Wádí Halfa, lizards with the typical coloration also show indications of a pale dorso-lateral band. Their lepidosis is 28, and they attain to 104 millim. from the snout to the vent. Proceeding still further northwards to Philæ and Assuan, the number 28 still prevails, and the mixed coloration of both the typical form and of var. *humilis* is preserved; but at the former of these localities 30 rows of scales are met with. Specimens with 28 and 30 scales are 112 millim. long.

At Luxor, however, although the usual markings are very distinct, a pale lateral band arises from each side of the occiput. In some, it only reaches a short way beyond the shoulder, while, in others, it is prolonged along nearly the entire length of the trunk. These pale bands are generally spotted with white, while the mesial brown band is unspotted. In one presenting these characters a short dark brown band from behind the ear is superadded, and is continued over the shoulder, marked with white spots, while in another the spots are nearly obsolete. These Luxor varieties thus lead into the one from Tangiers described and figured by Boulenger as *vittata*, whilst, at the same time, they have a strong resemblance to *tiligugu*; and the coloration of some of them resembles that of a specimen of that variety captured by me at Hammam R'irha, in Algeria, but differs from it in the absence of the dark lateral band that occurs below the pale dorso-lateral band. In their coloration they also resemble specimens from Duirat, Tunisia, which are more or less intermediate between typical *ocellata* and *tiligugu*.

In the oasis of Khargeh, to the south-west of Luxor, the usual spots are obsolete in one specimen, except on the posterior part of the body and on the tail, with distinct indications of pale lateral bands. In the only other example from the same locality the upper surface is uniform pale olive-brown unspotted, except on the tail, and it also has pale lateral bands. These specimens have 28 rows of scales, and the largest measures 96 millim. from snout to vent. These Luxor and Khargeh lizards thus present nearly the same characters as the Tokar and Suakin individuals already mentioned, so that they fall under var. *humilis*, Blgr., but they attain to a greater size than any typical example of the species from Lower Egypt, as the largest is 122 millim. from snout to vent, whereas the largest individual from the Maryut District is only 105 millim.

In the Fayum and at Gizeh, 28 is more prevalent than 30, but to the north of this 30 is almost universal, and as we reach the coast-line of the Mediterranean examples with 32 rows of scales round the body occur, thus overlapping the lepidosis of *tiligugu*. From the oasis of Siwah, to the west of Alexandria, I have received, through the assistance of Mr. Birdwood, five specimens<sup>1</sup>, which I suppose are the first that have ever been collected in that region, so difficult of access. Although all of them have 30 rows of scales round the body, each varies considerably in colour. In none is there any pale lateral band, but the general tint of the upper surface

<sup>1</sup> These specimens are not included in the table on p. 219, as it was in type before they were received.



and the transverse lines of black and white spots vary much. Two are coloured according to the typical form, and have the same slim body. Another has the same general tint, but very few spots; while one resembling it has the tail pale yellow, and thus in somewhat strong contrast to the body with its cross markings. The fifth has a slightly heavier body than the rest, but it is the largest, and it is rich pale yellowish olive, with only a few spots scattered over it, but not in transverse continuity.

From these facts it is evident that there is a distinct rise in the number of the scales round the body as we trace the species northwards from Eritrea to the delta of the Nile, and that the tendency is for the low lepidosis of 24 and 26 to be associated with a disappearance, or partial disappearance, of the characteristic spots, and the high numbers with their presence, but not invariably so. The specimens from the Sinaitic Peninsula have 28 to 30 rows of scales, and are of the typical coloration. A specimen from the neighbouring region of Midian, with 28 rows of scales, has all the general characteristics in form and colouring of the var. *tiligugu*, but with this slight exception, that the brown spots are more marked than the white ones. It measures only 100 millim. from snout to vent. A specimen collected by me at Hadrun Khan, near the Dead Sea, and others obtained by Canon Tristram in the same great depression, and also at Jerusalem, and a specimen in the British Museum from Jaffa, are generally characterized by the presence of 30 rows of scales, exceptionally 28, associated with all the other features of the typical form; and this is true also of a specimen from Cyprus. Passing to Aden, the species attains there a considerable size, but still adheres to the typical form, but with 28 to 30 rows of scales. It differs somewhat in its coloration from the Egyptian individuals, as the black and white spots are more strongly developed, and the white more so than the black, and their arrangement in transverse lines is less apparent. In the intensity of these markings the Aden lizard distinctly recalls that prevalent among the lizards on the Berbera side of the Gulf of Aden. Among 17 specimens from the Hadramut, some have the pronounced coloration of the Berbera lizards, while others, so far as coloration is concerned, are in no way distinguishable from those from Egypt. Only in 5 specimens out of 17 are there 28 rows of scales, while 12 have 30, and 1 has 32. A similar condition of things exists at Muscat as regards the strength of the coloration; but associated with it is a marked variation in which the whole upper surface of the lizard is rich dark brown, and in place of the black spots brown spots occur, a little darker than the general colour, while the white spots are reduced to fine points, and the labials become nearly entirely brown, with a small white central spot. Proceeding on to Bushire, the typical form is still preserved, and the strength of the coloration is as in Berbera, Aden, and Muscat individuals, but, as in the last-mentioned, some specimens show a distinct tendency to assume the brown garb. Their scales vary from 28 to 30. Further to the north, viz. at Jask, in Persia, the Eastern Arabian pronounced coloration is also present; but one lizard



is pale grey and another rich brown, and both have 30 rows of scales. In tracing the typical form of this lizard to the east, one is struck by the increase which it manifests in size over those found in Egypt; and in this respect the Arabian lizards also recall those found between Obbia and Berbera, in Somaliland, but they have never the thick heavy bodies of var. *tiligugu*.

In the British Museum there is a specimen of this lizard from Cyprus decidedly referable to *forma typica*. It has 30 rows of scales, and the coloration is typical, but the spots are somewhat less numerous than in Egyptian specimens, and the general tint is grey, and in these respects it resembles the Syrian lizards.

Proceeding to the west of Egypt, two Tripoli examples of this species (British Museum) in no way differ in form from those found at Alexandria, and have the highest lepidosis, viz. 32; but one has the markings of *forma typica*, and the other those of var. *tiligugu*. At Dairat, on the western frontier of Tripoli, the same form occurs with 30 and 31 rows of scales and the typical markings. These specimens are probably half-grown individuals of the very large lizard found along with them, and which differs from typical *ocellatus* in its much thicker and less rounded body—a feature by which this Tripoli lizard is distinctly referable to var. *tiligugu*. Still further to the west, viz. on the road between Biskra and Tuggurt, the lizards are intermediate in the form of their bodies between *forma typica* and *tiligugu*. In coloration they resemble *tiligugu*, but their scales present all the variations found in Lower Egypt, as they range from 28 to 32. Specimens exactly similar to them are found to the north at Guelma, on the Tell, and even at Tunis. A specimen collected by M. Lataste on the Plain of Sersou has 34 rows of scales round the body, and the dorso-lateral pale line well developed, more so than in any of the other specimens, and with the brown lateral line spotted with white also present. Indeed, this lizard in its coloration is exactly like a lizard from Syracuse in the British Museum. To the west of this all the Algerian lizards conform to the *tiligugu* type. I met with it at Hammam Meskoutine, where it is common, with 30 rows of scales, and also at Hammam R'irha, still further to the west, where it attains to a greater size than in the former locality, and has 32 rows of scales. In the Hammam Meskoutine specimen the black and white spots are much reduced in number, and along the lower border of the pale latero-dorsal line there is a distinct tendency to form a dark brown band below it, a feature which is well seen in the young specimen from Guelma, and is indeed more or less characteristic of all the Algerian examples, and is very distinctive of *tiligugu* from Malta, Sicily, &c. I have also met with two young individuals at Oran, and as far west as Tlemcen, with the coloration of *forma typica*, but with the lateral brown band well developed. Each has 32 rows of scales. In the British Museum a young specimen from the island of Lampedusa is coloured exactly like *forma typica*, with only the very faintest indication of a pale lateral line, whilst an older specimen

has the thick body and flat back of *tiligugu*, but the coloration of *forma typica*, with a pale dorso-lateral line, and the dark brown band below it only present behind the ear and over the shoulder. In the island of Limosa the scales number 30 in two specimens in the British Museum; they have the thick body of *tiligugu*, but the coloration is very dark, almost blackish brown, with the pale dorso-lateral line narrow and the brown lateral line very broad and much spotted with white. The black spots tend to form the characteristic transverse lines, but obscurely, in consequence of the dark colour, and the white spots are small but numerous. In Malta the lizard is large, like the Hammam Meskoutine and Hammam R'irha specimens, but with the pale dorso-lateral band very distinct, and also the brown white-spotted band below it. They have 30 rows of scales. In another specimen in the British Museum labelled Mediterranean there are 32 rows of scales, and this specimen in its coloration is very different from all the others, as the black and white ocelli, which are always more or less present in *tiligugu*, even although they cease to form continuous, zigzag, transverse lines, are absent in this specimen. Its back is covered with a succession of irregular brown markings tending to cross the body irregularly, and to be arranged more or less longitudinally. The pale dorso-lateral line is present but obscure, whereas the dark brown band is broad and spotted with pale olive-brown, which is the general colour of the upper parts. A specimen from Syracuse has 32 rows of scales, and is exactly like the specimen from the plateau of Sersou, in Algeria, the pale dorso-lateral and lateral brown bands being developed equally in both. There is a specimen in the British Museum from Sardinia presented by Prof. Bonelli; it is somewhat faded, but it has all the colour characters of the Syracuse specimen, but with 30 rows of scales; it has, however, the rounded attenuated body of *forma typica*.

At the city of Morocco, lizards with exactly the same form of body as the variety *tiligugu* are met with, but with the number of the scales rising from 34 to 40 (=the var. *polylepis*, Blgr.). Associated with this increase in the lepidosis there is a distinct change in the colouring of var. *tiligugu*, as the light dorso-lateral line and the dark brown lateral line with white spots entirely disappear. The characteristic transverse zigzag lines into which the black and white spots—*forma typica*, but less so in *tiligugu*—tend to arrange themselves become very obscure, but are still more or less indicated in some specimens, more especially in the young; but the general character is for each scale to be occupied by a small yellowish spot and margined with brown. At Rabat, still further to the west, and on the coast, the black or brown margins to the scales form continuous longitudinal lines enclosing the pale spots. This is a much better marked variety than *tiligugu*, to the dimensions of which it attains. At Dar el Beida (Casablanca) the scales are more feebly margined with brown, and the white spots are numerous, and their transverse arrangement is distinctly visible.

At Tangier, lizards occur, the leading features of which, so far as coloration is concerned, are the entire absence of any trace of either black or white spots on any part of the body, and the presence of great longitudinal bands of colour. Along the middle of the back from the snout to the tail there is a broad brown band which rapidly contracts between the hind limbs and is prolonged on to the upper surface of the tail as a narrow band. A narrow pale band, almost white, begins behind the nostril, gradually expanding till it becomes nearly half the breadth of the brown area of the back, and is continued on to the side of the tail. Beginning behind the eye is a deep black band, as broad as the previous band, and, like it, prolonged more or less on to the side of the tail. From below the ear, under the last band, a distinct pale greenish-blue band passes along the side of the body, extending well on to the lateral aspect of the belly. The underparts yellowish. The scales on the brown dorsal band have generally brownish posterior margins. The labials are marked almost exactly as in *forma typica*. There is a general tendency for the upper labials to decrease in size towards the fourth, but in a specimen from Sardinia the upper labials have the same character. The snout also is somewhat broader than in examples of *forma typica* from Egypt, but not more so than in *tiligugu*. The scales vary between 32 and 34. The uniformly coloured examples of *forma typica* in the extreme south-eastern range of the distribution of the species prepare us for the possible disappearance of the ocelli in other localities, and the existence of other examples in the same region with pale dorso-lateral lines opens up the way to the appearance of the pronounced pale bands of this variety. In the same way the dark brown lateral band that shows itself in *tiligugu* foreshadows the black lateral band of the variety *vittata*. In *tiligugu* the side of the body below the last-mentioned band is more or less suffused with bluish green, the equivalent of the more pronounced area of the same colour in *vittata*. The seeming divergence of coloration that subsists between such a variety as this from Tangier and the typically ocellated lizard is very striking, but the facts that have been adduced suffice to link the extremes together.

An examination of the scales of the 60 specimens from the localities mentioned in the accompanying table brings out the fact that the lowest number of scales (26) is not found in the northern extremity of the range of the species in Egypt, and that 30 is extremely rare at Suakin and Tokar, indeed exceptional; but of 32 examples collected between the shores of the Mediterranean and the Fayum, 20 have 30 rows of scales round the body, 11 have 28, and 1 has 32. Four of seven specimens obtained at Luxor have 26 scales, and three 28 round the body. Out of eight lizards from between Assuan and Wádi Halfa, the oasis of Khargeh and from Berys, seven have 28 rows of scales round the body, and one 30. Three specimens from Durrur have 28 scales and one 26. Among nine individuals from Suakin and Tokar, six have 26 scales, two have 28, and one has 30.

*Table giving the length (in millim.) of the body, snout to vent, of Chalcides ocellatus, and the number of scales round the body in each individual.*

Snout to vent.	Scales round body.		Snout to vent.	Scales round body.		Snout to vent.	Scales round body.	
48	30	Gizeh.	87	30	Mahallet el Kebir.	100	30	Cairo.
55	28	Cairo.	87	28	Gizeh.	101	26	Luxor.
57	28	Fayum.	87	28	"	102	28	Wádi Halfa.
58	26	Luxor.	88	26	Suakin.	102	30	Ramleh.
59	28	Suakin.	89	26	"	103	28	Luxor.
60	28	Durrur.	90	28	Marsa Matru.	104	28	Wádi Halfa.
65	30	Gizeh.	90	30	Cairo.	104	28	Gizeh.
68	30	Beltim.	91	30	Suakin.	104	30	"
75	32	Alexandria.	91	26	Tokar.	105	30	Maryut.
75	28	Durrur.	91	30	Ramleh.	106	30	Alexandria.
76	30	Alexandria.	91	28	Gizeh.	107	28	Philæ.
77	30	"	93	26	Suakin.	108	26	Luxor.
78	28	Luxor.	95	26	Tokar.	110	26	Suakin.
79	30	Mahallet el Kebir.	95	30	Marsa Matru.	112	28	Philæ.
79	30	Cairo.	96	30	Cairo.	112	30	"
81	28	Fayum.	96	28	Oasis of Khargeh.	115	26	Durrur.
83	30	Mahallet el Kebir.	97	30	Mahallet el Kebir.	115	26	Luxor.
84	28	Fayum.	97	28	Fayum.	117	28	Durrur.
85	28	Beltim.	100	28	Assuan.	119	28	Suakin.
85	28	Oasis of Khargeh.	100	30	Maryut.	122	28	Luxor.

More materials are needed from a much wider range of localities in Egypt, the Egyptian Sudan, and from the Abyssinian and Somaliland regions, in order to throw additional light on the position in which the supposed varieties *ragazzii* and *humilis* stand to the typical form, and when brought together it would add to the value of the results they might yield were each specimen carefully sexed beforehand, and some idea formed of its approximate age.



## CHALCIDES SEPOIDES, Aud. (Plate XXVIII. fig. 2.)

*Mabuya capistrata*, Fitz. (not described), Neue Class. Rept. 1826, p. 52.

*Scincus sepsoides*, Aud. Descr. de l'Égypte, Hist. Nat. i. ? 1829, p. 180, Suppl. pl. 2. figs. 9. 1-9. 2.

*Scincus sepsoides*, var., Aud. op. cit. p. 181, Suppl. pl. 2. figs. 10. 1-10. 2.

*Sphenops capistratus*, Wagler, Syst. Amph. 1830, p. 161; D. & B. v. 1839, p. 578, pl. lvii. fig. 3; Rüppell, Mus. Senck. iii. 1845, p. 304; Gervais, Ann. Sc. Nat. (3) x. 1848, p. 204; A. Dum. Cat. Rept. Paris Mus. 1851, p. 153; Gravenh. N. Acta Leop.-Carol. xxiii. 1851, i. p. 364, pl. xxxix.; Peters, Mon. Berl. Ak. 1862, p. 272; op. cit. 1864, p. 47; Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 42; Gasco, Viagg. in Egitto, pt. ii. 1876, p. 109; Boettger, Ber. Senck. nat. Ges. 1878-79, p. 72; op. cit. 1879-80, p. 192; Tristram, West. Palest., Rept. & Batr. 1884, p. 153.

*Sphenops sepsoides*, Reuss, Mus. Senck. i. 1834, p. 54; Gray, Cat. Liz. B. M. 1845, p. 122; Peters, Mon. Berl. Ak. 1880, p. 308.

*Chalcides sepsoides*, Blgr. Cat. Liz. B. M. iii. 1887, p. 407; Trans. Zool. Soc. xiii. 1891, p. 141; Pfeffer, Jahrb. Hamb. Wissensch. Anst. vi. 1889, p. 9; Boettger, Kat. Rept. Mus. Senck. 1893, p. 114; Werner, Verh. zool.-bot. Ges. Wien, xlv. 1895, p. 84.

*Chalcides (Sphenops) sepsoides*, Anderson, Herpet. Arabia & Egypt, 1896, p. 105.

6. Between Suez and Ismailia.

2. Abukir.

36. Neighbourhood of Pyramids of Gizeh.

1. Kafr Amar.

2. Tel el Amarna.

Snout wedge-shaped, projecting beyond the labial margin. Eye very small; ear an oblique slit close to the angle of the mouth, covered usually by three large pointed scales. Nostril anterior to the suture of the rostral and first labial; a small postnasal over the first and second labials; supranasals generally united as a single shield; frontal broader than long, or as long as broad. Usually four upper labials, the fourth below the eye. Body elongate, with the sides angular. Twenty-four rows of smooth scales round the body, occasionally twenty-six. Limbs feeble; the fore limb exceeds the distance between the eye and the end of the snout, and the hind limb almost invariably that between the axilla and the eye; digits 5-5, occasionally one suppressed on fore limb, rarely on the hind limb. Tail elongately conical, about four or five sixths the length of the body and head, or occasionally nearly as long.

Pale yellowish above, with eleven narrow brown longitudinal lines running from the occiput and the sides of the head between the rows of scales and continued on to the tail, but diminishing in numbers towards its end. A dark streak from the nostril through the eye to the temporal region and more or less on to the neck. The frontal and the shields behind it margined with brown. Sides and underparts yellowish white.



*Measurements &c. of C. sepoides, Aud., Lower Egypt (in millim.).*

Snout to vent.	Tail.	Eye to snout.	Fore limb.	Axilla to eye.	Hind limb.	Distance between limbs.	Scales round body.
46	40	3	4	9	9	32	24
65	61	4	6	12	15	44	24
75	63	5	7	14	16	53	24
87	85	5	8	15	19	60	24
88	71	6	7	16	19	62	24
90	84	5	9	17	20	60	24
96	80	5	8	16	19	72	24
109	..	6	8	19	21	81	24

This lizard, besides being found in sand, below stones, is likewise very common on the sand-drifts that occur in the hollows and depressions on the desert, also at the base of sparse vegetation and among the sand-dunes along the coast.

It moves rapidly through the sand, but when it finds itself completely covered, it comes to rest generally close to the surface.

The stomach is usually filled with the remains of small beetles, with a considerable admixture of sand swallowed in the act of seizing its prey.

It is widely distributed throughout Egypt and its oases, and over Northern Africa from Senegambia to the shores of the Red Sea. It is also found in Arabia and in Syria.

In a specimen from the Algerian Sahara at Tuggurt there are 26 rows of scales round the body, and a similar number is found in specimens from the Sinaitic Peninsula, Jerusalem, and Jaffa, but in the last-mentioned locality 24 are also found, and also in Senegal. In Egypt, on the other hand, not a single specimen collected by me has more than 24 rows of scales round the body.

The length of the limbs varies considerably among individuals from the same locality.

The numbers of the digits on the fore limb are unstable, as two specimens from Tel el Amarna have only three well-developed fingers, the first and fourth being reduced to mere rudiments assuming the form of minute lateral knobs. Two specimens also from Abukir have only four fingers, whereas the 36 individuals from the neighbourhood of the Pyramids of Gizeh have five digits to each extremity, with one single

exception, the absence of a finger being probably due, in this instance, not to non-development, but to an injury. In no Egyptian specimen have I ever found the hind limb with less than five digits on each foot.

In three specimens from the Pyramids of Gizeh there is complete division of the supranasal, while in three others there is partial division. A specimen from Senegal in the British Museum has it also divided. Only in one specimen is there any variation in the labial that enters the orbit. It occurs in a specimen from near the Pyramids of Gizeh, in which the third upper labial is under the eye, but only on the left side of the head.

Dr. Walter Innes informs me that this lizard is known to the natives of Lower Egypt as <sup>دافانة</sup> *daffana*, or the burrower.

I have already mentioned incidentally that little wooden and bronze boxes containing mummified lizards are met with in Egypt, and that there is generally on the lid a representation of the lizard preserved within. Lefebvre, on his visit to Egypt, obtained a small wooden box containing a lizard from an excavation in the neighbourhood of Thebes. It was examined by one of the authors of the 'Erpétologie Générale,' who pronounced the mummy, which was simply in a dried condition rolled in linen, to be an example of this species (*Chalcides sepoides*). At that time, the Egyptian collection in the Louvre contained another little box that also held a mummy of this species; and in the British Museum there are also a few small boxes containing lizards, not yet identified, but some of which may prove to be the same species. Why it was selected for preservation is difficult to conjecture.

*C. boulengeri*, from Tunisia, is a nearly allied species, with 28 rows of scales round the body, with 8 upper labials, and the fifth labial under the eye, and the nostril not in advance of the suture between the rostral and the first labial.

## CHALCIDES DELISLII, Lataste. (Plate XXVIII. fig. 3.)

*Allodactylus de l'Isle*, Lataste, Journ. Zool. v. 1876, p. 238, pl. x.

*Chalcides delislii*, Blgr. Cat. Liz. B. M. iii. 1887, p. 407.

*Chalcides (Sphenops) delislii*, Anderson, Herpet. Arabia & Egypt, 1896, p. 105.

3. Plain of Suakin. Surgeon-Captain R. H. Penton, D.S.O.

7. Plain of Suakin.

3. Durrur. Major-General A. Hunter, D.S.O.

20. Durrur.

This species resembles *C. sepoides*, but differs from it in having its ear slightly further away from the angle of the mouth, and by the absence of a fringe of pointed scales over it, the orifice being covered by ordinary scales which, however, leave it more or less visible. Its limbs are weak, like those of *C. sepoides*, but the fore foot is tridactyle and the hind foot tetradactyle. There is no postnasal and the supranasals are distinct. Seven upper labials are present, but, as in the foregoing species, the fourth is under the eye. It has generally 24 smooth scales round the body, but sometimes there may be only 22 and in others 26.

The largest specimen measures 94 mm. from snout to vent (tail imperfect); fore limb 6.7 mm., hind limb 15 mm. A perfect specimen, with a total length of 84 mm., has the tail 70 mm. long; fore limb 6.5, hind limb 14.

It is common among loose sand on the maritime plain at Suakin and at Durrur.

It is more closely allied, however, to *C. sphenopsiformis* than to *C. sepoides*, but differs from the former by having a longer fore limb, tridactyle instead of didactyle; in all other respects the two are identical.

Each of the 33 specimens has 3 digits on the fore foot and 4 on the hind foot, and there are only two exceptions to 24 scales round the body, one having 22 and the other 26, both specimens being from Durrur. Seven upper and lower labials are present in all but one, which has 6 above and 6 below, and there is only one exception to the rule that the fourth upper labial is below the orbit, and in this instance the third labial occupies that position.

In three specimens of *C. sphenopsiformis* in the British Museum each has 2 digits anteriorly and 4 posteriorly, and 24 rows of scales round the body. There are 7 upper labials in each, but only 6 lower labials, and, in all, the fourth labial is below the eye. Each has a postnasal over the first labial.

The type specimen of *C. delislii* was said to have been brought from Japan by M. Savatier, a ship captain. It formed part of the collection of the father of Professor A. Trémeau-Rochebrune, in whose collection it stood under the name of *Seps chalcides*. As the genus *Chalcides* is unknown in Japan, Mr. Boulenger has suggested that the

type may possibly have been received from Senegambia, where both *C. sphenopsiformis* and *C. sepioides* occur. M. Lataste, finding that it possessed only three digits anteriorly and four posteriorly, created a new genus for its reception, called *Allodactylus*. *C. sepioides*, however, has the fingers occasionally reduced to four and even to three, so no importance can be attached to the number of digits found in such degraded limbs as those of the members of this group.

*Synopsis of Egyptian Species of Chalcides.*

A. Body round, elongate; snout conical.

Limbs pentadactyle; nostril above suture of rostral and first labial. . . . *C. ocellatus*.

B. Body angular at sides, elongate; snout wedge-shaped.

Limbs pentadactyle; fore limb occasionally tetra- or tridactyle.

Ear with a fringe of pointed scales . . . . . *C. sepioides*.

Fore limb tridactyle; hind limb tetradactyle.

Ear without a fringe, more or less hidden by scales . . . . . *C. delislii*.

## RHIPTOGLOSSA.

## CHAMÆLEONTIDÆ.

## CHAMÆLEON.

*Chamælea*, Laurenti, Syn. Rept. 1768, p. 45.

Body compressed; head angular, with strong ridges; eye large, globular, covered by a thick granular lid, perforated by a hole in its centre; ear hidden; digits in two opposable groups of two and three; palmar and plantar scales smooth; claws simple; tail prehensile, as long as, or longer than, the body.

## CHAMÆLEON VULGARIS, Daud. (Plate XXIX.)

*Lacerta chamæleon*, Hasselq. & Linn. Iter Palæst. 1757, p. 297; *part.*, Linn. Syst. Nat. xii. ed. 1766, p. 364; Forskål, Descr. An. 1775, p. ix; Poirét, Voy. en Barbarie, i. 1789, p. 288.

*Chamæleo zeylanicus*, Laur. Syn. Rept. 1768, p. 46.

*Chamæleo vulgaris*, Daud. Hist. Rept. iv. 1802, pp. 181, 202; Rozet, Voy. dans la rég. d'Alger, i. 1833, p. 233; *part.*, Gray, Syn. Rept. Griffith's An. King. ix. 1831, p. 53; Cat. Liz. B. M. 1845, p. 265; Dum. & Bib. iii. 1836, p. 204; Gervais, Ann. Sc. Nat. (2) vi. 1836, p. 309; op. cit. (3) x. 1848, p. 204; Guichenot, Explor. Alg., Sc. Phys. Zool. v. 1850, p. 3; Tristram, Proc. Zool. Soc. 1859, p. 476; West. Palest., Rept. & Batr. 1884, p. 154; Steindachner, Unger & Kotschy's Insel Cypren, 1865, p. 572; De Betta, Fauna d'Italia, pt. iv. Rett. ed. Anfibi, 1874, p. 18; *part.*, Schreib. Herp. Europ. 1875, p. 496; Gasco, Viagg. in Egitto, pt. ii. 1876, p. 105; Lortet, Arch. Mus. Hist. Nat. Lyon, iii. 1883, p. 187; Reichenow, S.B. Ges. naturf. Freunde Berl. 1883, p. 149; Boettger, Abh. Senck. nat. Ges. xiii. 1884, p. 129; Kobelt's Reiseerin. Alg. u. Tunis, 1885, p. 472; S.B. Ak. Wissensch. Berl. 1888, p. 169; Verh. zool.-bot. Ges. Wien, xlv. 1896, p. 278; Hart, Fauna & Flora Sinai &c. 1891, p. 210.

*Chamæleo pallida*, Perry, Arcana, 1811 (sig. o), plate.

*Chamæleo africanus*, Licht. Verz. Doubl. Mus. Berl. 1823, p. 103; Guérin, Icon. Rept. Règ. An. 1829-44, pl. xv. fig. 1; Schlegel, Wagner's Reis. iii. 1841, p. 111.

*Chamæleon carinatus*, Merr. Syst. Amph. 1820, p. 162; Berthold, Abh. k. Ges. Wissensch. Göttingen, i. 1838 (1843), p. 9.

*Chamæleon subcroceus*, Merr. op. cit. p. 162.

*Le Caméléon trapu*, Is. Geoffr. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 134, pl. iv. fig. 3.

*Chamæleo siculus*, Grohmann, Nouv. descr. Camal. sic. 1832, p. 7.

*Chamæleon hispanicus*, Fitz. Syst. Rept. 1843, p. 42.

*Chamæleon rimulosus*, Fitz. op. cit. p. 42.

*Chamæleo vulgaris*, var. A, A. Dum. Cat. Rept. Paris Mus. 1851, p. 31; Arch. Mus. vi. 1852, pl. xxii. fig. 1.

*Chamæleo cinereus*, Strauch, Mém. Ac. St. Pétersb. (vii. sér.) iv. no. 7, 1862, p. 21; Boettger, Abh. Senck. nat. Ges. ix. 1873-75, p. 132; Ber. Senck. nat. Ges. 1878-79, p. 80.



*Chamaeleon vulgaris*, part., Gray, Proc. Zool. Soc. 1864, p. 469; Bedr. Bull. Soc. Nat. Mosc. 1879, no. 3, p. 40; Günther, Proc. Zool. Soc. 1864, p. 489; op. cit. 1879, p. 741; Blgr. Cat. Liz. B. M. iii. 1887, p. 443, pl. xxxix. fig. 1 (head); Trans. Zool. Soc. xiii. 1891, p. 142; Minà-Palumbo, Naturalista Siciliano, ix. 1890, p. 257; König, Verh. (S.B.) nat. Ver. Bonn, 1892, p. 22; Boettger, Kat. Rept. Mus. Senck. 1893, p. 117; Verh. zool.-bot. Ges. Wien, xlv. 1896, p. 278; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 105; Peracca, Boll. Mus. Torino, ix. 1894, no. 167, p. 10; Anderson, Herpet. Arabia & Egypt, 1896, p. 106; Francaviglia, Boll. Soc. Rom. Stud. Zool. v. fasc. i. & ii. 1896, p. 40.

*Chamaeleon auratus*, Gray, Proc. Zool. Soc. 1864, p. 469.

*Chamaeleon fasciatus*, J. A. Smith, Proc. Roy. Phys. Soc. Edinb. iii. 1866, p. 306.

*Chamaeleo vulgaris*, var. *reticrista*, Boettger, Ber. Senck. nat. Ges. 1879-80, p. 198.

*Chamaeleo* sp., F. Müller, Verh. nat. Ges. Basel, vii. 1885, p. 715, pl. xi.

*Chamaeleo saharicus*, F. Müller, op. cit. viii. 1887, p. 295.

1 ♂ and 2 ♀. Ain Musa.

2 juv. Egypt.

2 ♂ and 4 ♀. Marsa Matru.

Casque moderate, raised posteriorly, anteriorly convex; a small occipital dermal lobe on each side continued to the apex of the casque; supraorbital ridge prolonged on to the casque, but becoming indistinct as it ascends; the distance between the angle of the mouth to the apex of the casque about equals the length of the labial border; the distance from the base of the casque anteriorly to its summit almost equals the distance between the tip of the snout to the middle of the eye. Limbs well developed; no tarsal spur in the male. Tail shorter than, or as long as, the body and head. Sides of the head and casque with small and large polygonal tubercles, more or less conical or flat, largest on the free borders of the occipital lobes. Body with minute granules, somewhat varying in size, largest along the throat-folds. A feeble dorsal ridge of enlarged, somewhat pointed, conical tubercles, with a line of enlarged body-granules on each side of it. A gular ridge of large, conical, backwardly pointed tubercles, becoming gradually reduced in size posteriorly.

Colour usually green, with two interrupted white bands from opposite the middle of the occipital lobe, along the sides, to the base of the tail, and another from the axilla to the groin margined with darker green. The intervals between these lateral markings are leaden black in some, with still blacker spots. Occasionally there are about 26 reddish-brown cross-bands between the nape of the neck and the end of the tail. The mesial ventral line of scales white. In some specimens the colour is greyish brown, with similar markings as in the green phase.

The majority of specimens from Ain Musa were green, but some of them showed no traces of that colour in life, being wholly greyish brown. At Marsa Matru, where the species is common, this colour also occurs, and I have figured it in contrast to the green or more prevalent colour. This brown colour has been noticed by other observers.



CHAMAELÉON VULGARIS.

Fig. 1 ♀, Marsa Matru; Fig. 2, Wells of Moses, Suez.



*Measurements of Egyptian examples of C. vulgaris, ♂ and ♀ (in millim.).*

Sex.	Snout to vent.	Tail.	Snout to tip of parietal crest.	Tip of parietal crest to angle of mouth.	Length of gape.	Breadth of head.	Length of fore limb.	Length of hind limb.	Length of fore foot.	Length of hind foot.	Locality.
♂ ..	135	125	41	28	27	18	54	53	12	15	Ain Musa.
♀ ..	135	97	42	28·7	28	22·5	53	56·5	12	14	Marsa Matru.

This species is distributed over Northern Africa, from Mogador to Egypt. In Asia it is found in the Sinaitic Peninsula, in Palestine, Syria, and Asia Minor, and in some of the neighbouring islands, such as Cyprus, Rhodes, Chios, Xanthus, &c., and in Europe, in Southern Spain and along the coast of Turkey.

In the 'Description de l'Égypte' no information is given whence the individual figured in that work was obtained.

It is common at Marsa Matru, 150 miles to the west of Alexandria, but I have never succeeded in obtaining it in the delta. It is present, however, in the oasis of Ain Musa to the east of Suez, into which it has probably been introduced by human agency, possibly many centuries ago, from one or other of the more or less cultivated valleys on the way to Mount Sinai, unless the oasis itself be the last vestige of what may once have been an extensive fertile region conterminous with the valleys, but now nearly obliterated by the encroachment of the sands of the desert.

Mr. Noel Beyts, of Suez, informs me that he has heard from authentic sources that the chameleon now exists in the cultivated gardens on the banks of the Freshwater Canal at Suez, and he says that as there was no vegetation of any description near Suez before the Freshwater Canal was made, about 25 years ago, he presumes that it was brought from the oasis of Ain Musa; indeed he believes that chameleons were purposely introduced into the gardens surrounding the works connected with the water-supply of Suez.

The Arabic name of the chameleon is حَرَبَايَة = *hīrbāya*, according to my informant, Dr. W. Innes (Cameron, حَرَبَا = *hīrbā*). The natives do not distinguish the one species from the other.

Kuhl, in his meagre description of *C. africanus*, refers to fig. 1, pl. 82, of the first vol. of Seba, which represents a chameleon with a well-developed tarsal spur and an occipital dermal lobe, and consequently not *C. vulgaris*, but possibly either *C. calcarifer* or *C. calcaratus*.

The *C. auratus* was founded on a specimen of *C. vulgaris* from Arabia.

The direction and curvature of the parietal crest may vary considerably, as in some

it is nearly straight backwards, while in others the anterior curvature may be great. Gravid females with the parietal crest almost sessile, or more or less recumbent, correspond to the *Caméléon trapu* of Is. Geoff. St.-Hilaire. The occipital lobes also vary considerably in the degree of the backward convexity, but they are never absent.

The length of the tail may sometimes fall considerably short of the distance between the snout and the vent, while in others it may exceed it.

The number of enlarged granules on the body is liable to vary, also the size of the tubercles on the head and on the occipital lobes.

CHAMÆLEON CALYPTRATUS, A. Dum. (Plate XXX.)

*Chamæleo calypttratus*, A. Dum. Cat. Rept. Paris Mus. 1851, p. 31 & footnote p. 33; Arch. Mus. vi. 1852, p. 259, pl. xxi. fig. 1; Peters, Sitzb. Ges. naturf. Freunde, 1882, p. 43; Blgr. Cat. Liz. B. M. iii. 1887, p. 446; Mocquard, C. R. Soc. Philom. no. 12, 1895, p. 36; Anderson, Herp. Arabia & Egypt, 1896, p. 62.

Casque very large, greatly elevated posteriorly, with a strong anterior convexity, but slightly concave posteriorly; a rather feeble occipital dermal lobe on each side, but not continued to the apex of the casque; supraorbital ridge not ascending upwards along the casque; the distance between the angle of the mouth to the apex of the casque equals that between the tip of the snout and the shoulder; the distance from the base of the casque, anteriorly, to its summit equals the distance between the tip of the snout and the front of the shoulder. Limbs well developed; a tarsal spur in the male. Tail longer than the head and body. Sides of the head and casque with large polygonal flat scales, those along the margins of the casque more or less conical, and largest along the free border of the occipital lobes. Body with small tubercles separated by minute granules. A dorsal ridge of large, conical, backwardly pointed tubercles, largest on the anterior third of the back, becoming smaller behind, but more or less prolonged on to the tail. A gular ridge of triangular, sharply pointed, sickle-shaped lobules, diminishing in size on the two posterior thirds of the body.

General colour of an adult male from Yemen, in alcohol, olive-green; a black band from the apex of the casque along its sides to above the eye; a narrow black band behind the eye to the angle of the mandible; a series of large, irregularly shaped, blackish spots on the sides arranged more or less in two longitudinal series; a black area from behind the mandible to the ventral crest and over the shoulder; about 20 broadish dark bands on the tail; dorsal and ventral crests whitish.

One of the females from the Paris Museum is olive-grey, with a yellow lateral band above the shoulder margined with blackish, and another from the axilla to near the groin. The head-markings are the same as in the male.





CHAMAELEON CALYPTRATUS.

♂, Yemen, Arabia.

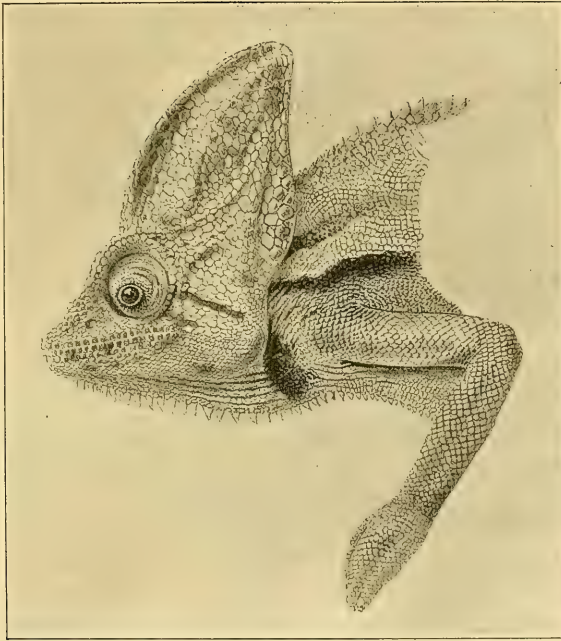


*Measurements (in millim.) of an adult male from Yemen and an adult female from the Nile valley.*

	♂.	♀.
Total length . . . . .	425	423
Vent to tip of tail . . . .	220	235

This species, first described by A. Duméril, from the Nile region, was recorded, in 1882, from the island of Socotra by Peters, who, on that occasion, mentioned that another example, from Abyssinia, obtained by Ehrenberg, was preserved in the Berlin Museum.

Fig. 8.



One of the types of *C. calyptratus*, A. Dum. Nat. size. ♀. Paris Museum.

In the course of an examination of the small collection of Reptiles in the Museum of the Medical School at Cairo, I found a very fine male chameleon, which Dr. Walter Innes, the Curator, informed me came from Yemen, in Arabia. I obtained his permission to bring it to Europe, and through the unfailing courtesy of Professor Vaillant

I was enabled to compare it in London with one of the types of *C. calyptratus* preserved in the Paris Museum. Fig. 8 (p. 229) represents the head and shoulders of the latter specimen of the size of nature, and if it be compared with the life-sized figure of the Yemen male (Plate XXX.) it will be seen that the only difference between the two lies in the slightly lesser development of the crest in the type, which, however, is sufficiently explained by the fact that it is a female. There is no other feature of any importance in which they differ.

M. Mocquard, some years ago<sup>1</sup>, was disposed to regard the type specimens of *C. calyptratus* as females of *C. calcarifer*, Peters, but more recently<sup>2</sup> he has acquiesced in Mr. Boulenger's opinion that the two are quite distinct species, and has pointed out that, as there is also a specimen from Yemen in the Paris Museum, the two species exist side by side in Arabia, which is further verified by the Cairo male from the same region.

I am, however, not quite satisfied that, with larger materials, the differences that now are supposed to separate *C. calcarifer* from *C. calyptratus* may not eventually break down. If, however, they should not, then the two, as now, must be regarded as very closely allied species<sup>3</sup>.

#### CHAMÆLEON BASILISCUS, Cope. (Plate XXXI.)

? *Chamæleo africanus*, Laur. Syn. Rept. 1768, p. 46.

*Chamæleon vulgaris*, part., Gray, Cat. Liz. B. M. 1845, p. 265; part., Proc. Zool. Soc. 1864, p. 469; Rüppell, Mus. Senck. iii. 1845, p. 299; part., A. Dum. Cat. Rept. Paris Mus. 1851, p. 31; part., Schreib. Herp. Europ. 1875, p. 496, fig. 97; Gasco, Viagg. Egitto, pt. ii. 1876, p. 105.

? *Chamæleo vulgaris*, Lefebvre, Abyss. vi. Zool. 1845-50, p. 193; Del Prato, Atti Soc. Ital. Sc. Nat. xxxv. 1895, p. 25.

*Chamæleon basiliscus*, Cope, Proc. Ac. Philad. 1868, p. 316; Blgr. Cat. Liz. B. M. iii. 1887, p. 446, pl. xxxix. fig. 3; Ann. Mus. Civ. Genova, ser. 2, xvi. (xxxvi.) 1896, p. 552; Boettger, Kat. Rept. Mus. Senck. 1893, p. 118; Anderson, Herpet. Arabia & Egypt, 1896, p. 106.

*Chamælio levigatus* (non Gray), Blanford, Geol. & Zool. Abyss. 1870, pp. 128, 445.

2 ♂, 1 juv., and 1 juv. ♀. Ramleh.

1 ♀. Tokar. Major H. W. Jackson.

1 ♂, 3 ♀, and 1 juv. Suakin.

1 ♀ and 1 juv. Wādī Halfa. Surgeon-Captain R. H. Penton, D.S.O.

Casque moderate, elevated posteriorly, with a slight anterior convexity, but nearly vertical posteriorly; no dermal occipital lobes; supraorbital ridge strong, prolonged on

<sup>1</sup> C. R. Soc. Philom. no. 19, 1893, p. 5, footnote.

<sup>2</sup> *Op. cit.* no. 12, 1895, p. 36.

<sup>3</sup> Herpet. Arabia & Egypt, 1896, p. 62.



CHAMÆLEON BASILISCUS.  
♀, Wādî Halfa.





to the side of the casque, but becoming indistinct as it ascends; the distance between the angle of the mouth to the apex of the casque equals or slightly exceeds the length of the labial border; the distance from the base of the casque anteriorly to its summit about equals or slightly exceeds the distance between the tip of the snout and the middle of the eye. Limbs well developed; a tarsal spur in the male. Tail generally equals the length of the body and head. Sides of the head and casque with nearly equal, moderately large, polygonal, or round or flattened tubercles. Body with small granules, and with very minute ones, uniform in size, scattered among them. A very feeble dorsal ridge of triangular tubercles, becoming lost posteriorly; a gular ridge of enlarged conical tubercles, becoming more indistinct towards the vent.

Colour generally rich grass-green, either with two lines of spots along each side, the lower extending from the axilla to the groin, or the lines broken up into spots, the colour of both lines and spots varying from black to white; mesial ventral ridge white; under surface of the limbs mottled with dusky.

*Measurements of four specimens of C. basiliscus, Cope (in millim.).*

Sex.	Snout to vent.	Tail.	Locality.
♂ . . . . .	123	138	Ramleh.
♂ . . . . .	115	117	Suakin.
♀ . . . . .	152	152	"
♀ . . . . .	132	123	"

This species occurs at Ramleh, close to Alexandria, where it is well known to the Arabs in charge of the gardens of Europeans; but whether it also occurs at Alexandria and at Cairo I have been unable to ascertain. Belon (1553 A.D.), however, has figured what I believe to have been this species, and in connection with his remarks on the Egyptian chameleon he mentions Alexandria and states that it was found in his day in all the garden hedges around Cairo and the banks of the Nile. George Sandys (1673 A.D.), in speaking of chameleons (the species, however, to which he referred is not indicated), states that they were in great numbers in the orchards of Cairo, but that they were not easily discovered on account of their colour being so alike to that of the trees on which they were found. Sonnini also mentions that he saw several chameleons at the entrance to the catacombs near Alexandria.

In the British Museum there is a specimen said to have been obtained in Syria, but the extension of this species to Syria has yet to be established. In the same collection there are also three specimens said to have come from Western Africa, and one specimen

from the Cape of Good Hope, to which it had probably been imported, as suggested by Mr. Boulenger. It is the common chameleon of the Suakin district and also of Wādī Halfa, whence it is occasionally imported into Lower Egypt, which may probably account for its presence at Ramleh. It is found in Abyssinia and Eritrea (Ghinda). James Burton's specimen, in the British Museum, from Egypt, bears no more special indication of the locality whence it came. The species is probably exclusively African, and its headquarters appear to be the Abyssinian region and the valley of the Upper Nile, extending eastwards to the shores of the Red Sea.

It bears the same Arabic name as *C. vulgaris*, but it is known to the Hadendowahs of Suakin as *Kumtashoak*.

The *C. africanus*, Laurenti, was founded on fig. 4, pl. 83, of the first vol. of Seba. This figure depicts a chameleon, said to have been from Africa, with a tarsal spur and with no occipital lobe. These are essentially the chief features of *C. basiliscus*, Cope. I hesitate, however, to adopt the former term in preference to *C. basiliscus*, regarding which there can be no doubt.

*Synopsis of Egyptian Species of Chamæleon.*

No rostral appendages.

A. Occipital dermal lobes present.

Casque moderately elevated posteriorly, occipital dermal lobes reaching its apex. No tarsal spur in the males . . . . . *C. vulgaris*.

Casque greatly elevated posteriorly, occipital dermal lobes not reaching its apex. A tarsal spur in the males . . . . . *C. calyptratus*.

B. Occipital dermal lobes absent.

A tarsal spur in the males . . . . . *C. basiliscus*.

## OPHIDIA.

GLAUCONIIDÆ<sup>1</sup>.

## GLAUCONIA.

*Glauconia*, Gray, Cat. Liz. B. M. 1845, p. 139.

Head not defined from neck; snout rounded or hooked; rostral large, prolonged on to the upper surface of the head; nasal large, entering the lip, semidivided from behind or divided by an oblique incision; ocular large, erect, bordering the lip or excluded from it, separated above from its fellow by one or more scale-like shields; frontal small, scale-like; supraocular present or absent; præanal plate enlarged.

GLAUCONIA CAIRI, Dum. & Bibr. (Plate XXXII. fig. 1, and fig. 9 text.)

*Stenostoma cairi*, Dum. & Bibr. vi. 1844, p. 323; Jan, Icon. Gén. 2 livr. Dec. 1861, pls. v. & vi. fig. 6; Icon. Gén. texte, 1864, p. 37; Gasco, Viagg. in Egitto, pt. ii. 1876, p. 116; Müller, Verh. nat. Ges. Basel, vii. 1882, p. 141.

*Glauconia cairi*, Blgr. Ann. & Mag. N. H. (6) vi. 1890, p. 92; Cat. Snakes B. M. i. 1893, p. 65; Anderson, Herpet. of Arabia & Egypt, 1896, p. 106.

2. Island of Rhoda, Cairo. Dr. Walter Innes.

1. Ground-floor of a house, Cairo.

1. In the alluvium, Luxor.

1. Garden of the Luxor Hotel, amongst wet grass.

1. Durrur.

Snout rounded; rostral broader than the nasal, prolonged backwards nearly to the level of the eyes; nasal semidivided; nostril not far from the rostral; first labial very small, less than one-fourth the size of the second labial; ocular nearly as large as the nasal, broadly entering the labial margin; one supraocular, slightly larger than the frontal; five lower labials; diameter of the body about  $\frac{1}{10}$  of the total length; tail about fourteen times in the length; fourteen scales round the body. Reddish purple-brown above, paler below.

Total length 193 millim., tail 14 millim.; greatest diameter 2·3 millim.

I have met with this species myself only at Luxor. One specimen I captured among freshly watered grass in the garden of the hotel at Luxor, and the other was dug out of the banks of a canal that were being trimmed. The specimens from the island of Rhoda were found under stones close to the river, the ground below

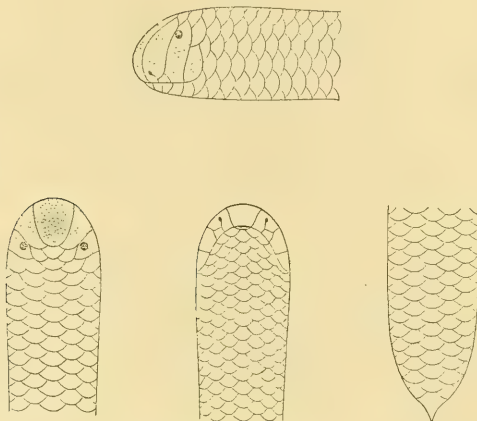
<sup>1</sup> Blgr. Cat. Snakes B. M. i. 1893, p. 57.

them being quite moist, while one was found on the ground-floor of a house in Cairo.

At present it is known only from the foregoing localities.

It is called by the natives  $\zeta = bahh$ .

Fig. 9.



*Glauconia cairi*, D. & B.  $\times 9$ .

*Measurements (in millim.) of G. cairi, D. & B.*

Total length.	Tail.	Diameter of body.	Locality.
182	18	2	Island of Rhoda, Cairo.
110	7	1.5	Ground-floor of a house, Cairo.
196	13.5	2.3	In the alluvium, Luxor.
193	14	2.3	Wet grass in garden, Luxor Hotel.
175	13	2	Durrur.

This *Glauconia* is extremely active in its movements, and, when any attempt is made to capture it, it wriggles about with great activity, and, owing to the polished character of its scales, it can only be laid hold of with difficulty.

Nothing is known regarding its food.



The species described by Jan as *Stenostoma fitzingeri*<sup>1</sup> is a closely allied form. I am indebted to Professor Andres, of the Milan Museum, for the information that the type is marked in Jan's handwriting "Is. Rhodus." It was received from the Vienna Museum. In view of the close similarity of *G. fitzingeri* to *G. cairi*, may not the "Is. Rhodus" of Jan be the island of the same name in the Nile at Cairo, and not, as has been supposed, the island of that name at the entrance to the Ægean Sea?

Jan has described a *Glauconia* with a hooked beak, from Sennaar, under the name of *Stenostoma macrorhynchum*<sup>2</sup>. There is a specimen (said to be from the "Euphrates?") in the British Museum that agrees with Jan's figure.

In 1896, M. Jaquet<sup>3</sup> found near Biskra, on the confines of the Algerian Sahara, a *Glauconia* regarding which he consulted Professor Boettger, who suggested that it was allied to *G. macrorhynchus*. M. Jaquet, however, believing that it differed from that species, named it *G. algeriensis*. The features of *G. macrorhynchus* are its prominently hooked snout, concave inferiorly; the presence of a supraocular; the rostral prolonged backwards to the level of the eyes; a divided nasal; the ocular bordering the lip, with a very small labial in front of it and a larger labial behind it. These features are represented in M. Jaquet's figure of *G. algeriensis*, with the exception of the third, as the rostral is portrayed as being continued slightly behind the level of the eyes; but this detail is rectified by the description, in which it is said that it is not prolonged beyond the level of the eyes. In the drawing the nasal is also represented as completely divided, but in the description it is stated "La nasale n'est pas divisée." The ocular in the sketch is shown to reach the labial margin and to have a labial before and behind it. The features of this species, so far as they can be made out from the figures and description, leave little doubt regarding its identity with *G. macrorhynchus*.

On the coffin of Nesi-Pa-Ur Shef, XVIIIth Dynasty, a small serpentine red-coloured figure occurs that recalls the form and general appearance of a *Glauconia*.

<sup>1</sup> Icon. Gén. 2 livr. Dec. 1861, pls. v. & vi. fig. 7; Arch. Zool. Anat. Fisiol. i. 1862, p. 189; Icon. Gén. texte, 1864, p. 37.

<sup>2</sup> Icon. Gén. 1 livr. Dec. 1860, pls. v. & vi. fig. 12; Arch. Zool. Anat. Fisiol. i. 1862, p. 190; Icon. Gén. texte, Oct. 1864, p. 39; Blgr. Ann. & Mag. N. H. (6) vi. 1890, p. 92; Cat. Snakes B. M. i. 1893, p. 61.

<sup>3</sup> Bibliogr. Anat. (Nicolas), 1896, No. 2, pp. 79-80, 7 figs.

BOIDE<sup>1</sup>.

## ERYX.

*Eryx, part.*, Daud. Rept. vii. 1803, p. 251.

Head not distinct from the neck; body cylindrical; tail short, thick, conical, or terminating in a sharp point. Upper surface of head scaly; rostral large; eye small, pupil vertical. Body-scales small, smooth or keeled, numerous; subcaudals single. Maxillary and mandibular teeth decreasing in length from before backwards.

## ERYX THEBAICUS, Reuss. (Plate XXXII. fig. 2.)

? *Anguis colubrinus*, Hasselq. & Linn. Iter Palæst. 1757, p. 320; Linn. Syst. Nat. i. 1766, p. 390.

? *Anguis colubrinus*, Gmel., Linn. Syst. Nat. i. pt. 3, 1788, p. 1119; Schn. Hist. Amph. 1801, p. 338.

? *Eryx colubrinus*, Daud. Hist. Rept. vii. 1803, p. 261.

? *Tortrix colubrina*, Merr. Syst. Amph. 1820, p. 83.

*Eryx de la Thébaïde*, Is. Geoff. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 141, pl. vi. fig. 1.

*Eryx thebaicus*, Reuss, Mus. Senck. i. 1834, p. 134; Dum. & Bibr. vi. 1844, p. 468; Schleg.

Bijdr. tot de Dierkunde, i. 1848, p. 2; Gray, Cat. Snakes B. M. 1849, p. 109; A. Dum.

Cat. Rept. Paris Mus. 1851, p. 214; Jan, Iconogr. Gén. 4 livr. 1864, pl. i. fig. 2, et texte,

1865, p. 73; Westphal-Castel. Cat. Coll. Rept. 1869, p. 27; Peters, Mon. Berl. Ak. 1878,

p. 205; Müller, Verh. nat. Ges. Basel, vii. 1882, p. 141; Mocquard, Mém. Cent. Soc. Philom.

1888, p. 122\*; Sclater, Snakes Ind. Mus. 1891, p. 6; Blgr. Cat. Snakes B. M. i. 1893, p. 125;

Proc. Zool. Soc. 1896, p. 216; Ann. Mus. Civ. Genova, (2) xvi. (xxxvi.) 1896, p. 552; op. cit.

(2) xvii. (xxxvii.) 1896-97, p. 20 et p. 279; Anderson, Herpet. Arabia & Egypt, 1896, p. 106.

*Eryx scutata*, Gray, Zool. Misc. 1842, p. 45.

*Eryx jaculus*, var. *sennaariensis*, Jan, Iconogr. Gén. 4 livr. 1864, pl. ii. fig. 2.

*Erix thebaicus*, Gasco, Viagg. in Egitto, pt. ii. 1876, p. 116.

*Eryx jaculus*, var. *surinamensis*, Parenti e Picaglia, Rett. ed Anf. Mar Rosso, 1886, p. 38.

*Gonylophis thebaicus*, Blgr. Ann. & Mag. N. H. (6) ix. 1892, p. 76.

<sup>1</sup> The rock-snake, *Python sebae*, Gmel., which attains to 7 metres in length, was observed 100 years ago in Abyssinia by Bruce the traveller †. In 1836 ‡ M. d'Arnaud obtained it on the Expedition sent by Mohammed Ali to discover the sources of the White Nile, but the locality where it was found has not been stated. Petherick § met with it to the south of Khartum. Boulenger has recorded it from Somaliland ||. It is mentioned here, as it may possibly have a more northerly extension than Khartum.

† Voy. Abyss. v. 1790, p. 199.

‡ Dum. & Bibr. Erpét. Gén. vi. 1844, p. 406; A. Dum. Cat. Rept. Paris Mus. 1851, p. 210.

§ Blgr. Cat. Snakes B. M. i. 1893, p. 87.

|| Ann. Mus. Civ. Gen. (2) xvii. (xxxvii.) 1896, p. 20.



GLAUCONIA CAIRENSIS. Fig. 1, Luxor.  
ERYX TCHADICUS. Fig. 2, Tel el Amarna.



- 1 ♂. Fayum. Major R. H. Brown, R.E., C.M.G.  
 1 ♀. Tel el Amarna. Professor W. M. Flinders Petrie, D.C.L.  
 2 ♂ and 2 ♀. Karnak.  
 3 ♂, 3 ♀, and 1 juv. Suakin.  
 2 ♀. Tokar.  
 2 ♀. Durrur.

Scales on the upper surface of the head small and smooth; anterior nasals and internasals enlarged; rostral large, with an angular labial border. Eyes separated above by 10 to 12 rows of scales and surrounded by 12 to 15 scales; 5 or 6 scales between the eyes and the nasal, and generally 2, rarely 3, scales between the eyes and the upper labials; 11 to 15 upper labials, generally 13. Mental groove absent or rarely present. 43 to 52 scales round the body, smooth or feebly keeled anteriorly, but strongly carinate on the posterior third of the body, especially on the tail. 171-197 ventrals, 1 anal, and 19 to 28 subcaudals. Tail short, conical, more or less pointed, and when perfect terminating in a conical scale.

General colour yellowish, with large, irregular, more or less transverse, purplish-brown markings, frequently confluent on the mesial line of the back, and prolonged on to the sides, on which there are occasionally detached similarly-coloured spots, separated from each other by narrow irregular interspaces of the ground-colour. A dark, generally ill-defined, oblique, irregular line from the forehead through the eye. In others (Suakin) the upper surface is nearly uniform purplish brown, the pale interspaces being almost lost. Under surface yellowish, immaculate.

It attains to 645 millim. in length, of which the tail measures 49 millim.

The two species of this genus met with in Egypt and the Eastern Sudan are found on the margin of the desert and in dry situations in the alluvium.

*E. thebaicus* is very common in Upper Egypt, but is much less so in Lower Egypt, and it does not appear to be found to the north of Cairo. It is the only species present at Suakin. It is widely distributed over East Africa, and, according to A. Duméril, extends westwards to Senegal<sup>1</sup>.

The members of this genus burrow in non-indurated sand. They are very gentle in their disposition and seldom attempt to bite. Their food consists of small lizards, such as *Stenodactylus elegans*, the remains of which I have removed from the stomach of *E. thebaicus*. After they have seized their prey they envelop it in their coils, much in the same way as does a python.

According to Dr. Zander<sup>2</sup>, who with Dr. F. Werner<sup>3</sup>, has given an interesting

<sup>1</sup> Professor Boettger, in his "Die Reptilien und Amphibien von Marocco.—II." (Abh. Senck. nat. Ges. xiii. 1884, p. 104), included *E. thebaicus*, Reuss, and quoted Günther, apparently by mistake for Selater, as his authority; but the evidence adduced as a proof of its existence in that region of Africa is inconclusive.

<sup>2</sup> Zool. Garten, xxxvi. 1895, p. 331.

<sup>3</sup> *Op. cit.* xxxvii. 1896, p. 80.



account of the habits of *Eryx jaculus* in confinement, it would appear that the members of this genus fall a prey to *Varanus griseus*.

I have heard two names applied by the natives of Egypt to this snake and to *Eryx jaculus*. The first, and that most commonly used, is دَسَّاس = *dassas*. According to Ulfaz Udwjeh, دَسَّاس = *dassas*, a noxious kind of serpent, and دَسَّاسَة = *dassâsat*, an earthworm living underground. The other term I have heard applied to *Eryx jaculus* I wrote down at the time as *terayshay*. I am also informed that it is known as حَيَّة دَفَّانَة = *haya daffana*, the burrowing snake. All of these terms, however, require investigation by a competent Arabic scholar.

In the accompanying table will be found a record of some of the variations met with in this species.

*Measurements (millim.) and other details of E. thebaicus, Reuss.*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Scales between eyes.	Scales round eyes.	Scales between eyes & labials.	Scales between eyes & nasals.	Upper labials.	Mental groove.	Locality.
♂	475	43	179	1	24	45	12	13	2	6	13	None.	Fayum.
♀	508	43	188	1	21	51	11	14-15	2	5-6	12-13	Present.	Tel el Amarna.
♀	645	49	186	1	23	47	11	13	3	5-6	13	None.	Karnak.
♂	305	26	186	1	27	43	11	12-14	3	6	13	"	"
♂	277	24	188	1	24	44	11	12-13	2	5	11	"	"
♀	268	22	192	1	23	46	11	12-14	2	5	13	"	"
♀	465	37	192	1	25	47	12	13	2	6	13	"	Suakin.
♀	275	22	188	1	23	47	12	13	2	5	13	"	"
Juv.	187	15	187	1	28	43	12	13	2	5	12	"	"
♀	330	24	188	1	24	50	12	13	2	6	12	"	"
♂	241	22	182	1	24	47	11	12	2	5	12	"	"
♂	250	23	186	1	26	47	12	12	2	5	12	"	"
♂	385	30	192	1	21?	45	11	12	2	5	13	"	"
♀	527	42	187	1	23	49	11	13	2	5	13	"	Tokar.
♀	510	39	191	1	23	52	11	14	2	5	15	"	"
♀	487	40	182	1	26	45	10	13	2	5	13	"	Durrur.
♀	210	15	184	1	22	45	11	12	2	6	13	"	"

*Analysis of foregoing Table.*

Largest male 475 millim. Largest female 645 millim.

Highest number of ventrals	192 ♀ & ♂.	Karnak and Suakin.
" " caudals	28 juv.	Suakin.
Lowest number of ventrals	179 ♂.	Fayum.
" " caudals	21 ♀.	Tel el Amarna.
Range of ventrals	179-192=13.	
" caudals	21-28= 7.	
Highest number of scales	52 ♀.	Tokar.
Lowest " "	43 ♂ & juv.	Karnak and Suakin.
Range of scales	43-52= 9.	

6 males, 10 females, and 1 juv.

When studying the descriptions given by Hasselquist and Linnæus in the 'Iter Palæstinum' of *A. jaculus* and *A. colubrinus*, one is struck by the fact that the particulars they give regarding the tails of these two species correspond to the features presented by the same parts of *E. jaculus* and *E. thebaicus*, both of which occur in Lower Egypt. Although the descriptions of *A. jaculus* and *A. colubrinus* do not supply any more details by which the two can be recognized, we are not entitled to conclude that Hasselquist and Linnæus were merely describing the same species twice over, but are rather led to believe that they had before them the two species found in Lower Egypt, the essential differences of which they had failed to express. I am therefore disposed to the supposition that the *A. colubrinus* represents the *Eryx* now known as *E. thebaicus*.

As the type specimen of *A. jaculus* appears in Linnæus's Catalogue of the Museum of King Adolphus Frederick, at Drottningholm, I wrote to Professor F. A. Smitt, of the Stockholm Museum, asking him to be so good as let me know what had become of the King's Museum. He informed me that when it was dispersed, in the beginning of the century, it was divided into two parts, one of which, for the most part the dried specimens, went to the University of Upsala, and the other to the Museum of the Academy of Sciences at Stockholm, at present known as the Royal Museum of Natural History, and he added that the latter Institution had had transferred to it the serpents from the voyage of Hasselquist, which had served as the type specimens of the Linnean species *Coluber situla*, *C. jugularis*, *C. haje*, and *Anguis jaculus*, and that, according to an old catalogue, it also possessed the Linnean type specimens of 73 other species of serpents. In view of the existence of these four Linnean types, said to be from Egypt, I deputed Mr. P. J. Smit, the artist who has illustrated this work, to proceed to Stockholm to make drawings of them and of any other types of Linnean species of Egyptian snakes that might possibly be at Stockholm or at Upsala. I had hoped also that he might perchance find the type of *A. colubrinus*, but unfortunately it no longer exists.

A species allied to *E. thebaicus*, viz. *E. muelleri*, Blgr.<sup>1</sup>, has been described from

<sup>1</sup> Ann. & Mag. N. H. (6) ix. 1892, p. 74; Cat. Snakes B. M. i. 1893, p. 128, pl. v. fig. 2.

Sennaar. It has a pointed tail ending in a curved claw, but differs from the former in having only 5 scales between the eyes instead of 12-15, and in having a fewer number of scales round the body, viz. 41-45. Its dorsal spots are confluent into a zigzag band. The snake from Khartum, in the province of Sennaar, described as *om-magneb* in the Atlas (pl. xx. fig. 3) to Brocchi's posthumous work<sup>1</sup>, may very possibly be this species. It is stated to have had 181 ventrals and 20 subcaudals, and the colour is said to have been "supra pallide flavescent, maculis magnis confluentibus brunneis (*vel* colore di marrone carico)." The term applied to it is stated by Brocchi's editor to be derived from "*genab*," which, in the idiom of Sennaar, means wicked.

Herodotus<sup>2</sup> relates that there were sacred serpents at Thebes of small size, and with two horns growing out of the top of the head, and that they were perfectly harmless. They may have been specimens of the horned viper with their poison-fangs removed, and in this sense harmless; but it is also possible that the natives of those days, 460-454 B.C., may have practised a deception on the Greek historian similar to that to which the Swedish naturalist<sup>3</sup> was subjected in 1750-51 A.D., who also states that his horned snake was not poisonous.

ERYX JACULUS, Hasselq. & Linn. (Plate XXXIII. & Plate XXXIII. A.)

*Anguis cerastes*, Hasselquist, Acta Soc. Reg. Sc. Upsal. 1751, p. 28; Hasselq. & Linn. Iter Palæst. 1757, p. 320; Linn. Syst. Nat. 1766, p. 391; Gmelin, Syst. Nat. Linn. i. pt. 3, 1788, p. 1120; Schneid. Hist. Amph. 1801, p. 317.

*Anguis jaculus*, Hasselq. & Linn. Iter Palæst. 1757, p. 319; Linn. Mus. Adolph. Frid. ii. 1764, p. 48; Syst. Nat. i. 1766, p. 391; Gmel. Syst. Nat. Linn. i. pt. 3, 1788, p. 1120; Schneider, Hist. Amph. 1801, p. 319.

*Anguis miliaris*, Pallas, Reise, ii. 1771, p. 718; Zoogr. Ross.-As. iii. 1811, p. 54.

*Boa turcica*, Oliv. Voy. Emp. Othom. i. 1801, p. 199, pl. 16. fig. 2.

*Eryx cerastes*, Daud. Hist. Rept. vii. 1803, p. 254.

*Eryx jaculus*, Daud. Hist. Rept. vii. 1803, p. 257; Schneider, Denksch. Ak. Wissensch. München, vii. 1821, p. 129; Wagler, Syst. Amph. 1830, p. 192; Gray, Syn. Rept. Griffith An. Kingd. ix. 1831, p. 98; Bibr. et Bory de St. Vinc. Expéd. Sc. Mor., Zool. Rept. 1833, p. 73; Reuss, Mus. Senck. i. 1834, p. 133; *part.*, Bonap. Mem. R. Ac. Sc. Torino, (2) ii. 1840, p. 428; Gray, Zool. Misc. 1842, p. 45; Dum. & Bibr. vi. 1844, p. 463; Schlegel, Bijdr. tot de Dierk. i. 1848, p. 2; Gray, Cat. Snakes B. M. 1849, p. 109; A. Duméril, Cat. Rept. Mus. Paris, 1851, p. 213; Peters, Mon. Berl. Ak. 1862, p. 272; Strauch, Mém. Ac. Sc. St. Pétersb. (vii.) iv. no. 7, 1862, p. 51; Jan, Congr. Gén. 4 livr. 1864, pl. ii. fig. 1, texte, 1865, p. 72; Westphal-Castel. Cat. Rept. 1869, p. 27; Strauch, Mém. Ac. St. Pétersb. (vii.) xxi. no. 4, 1873, p. 29; Schreiber, Herp. Europ. 1875, p. 312; Blanford, Eastern Persia, (Zool.) ii. 1876, p. 401; Gasco, Viagg. in Egitto, 1876, p. 116; Boettger, Zeitschr. ges. Nat. (Giebel) xlix. 1877, p. 287; Ber. Senck. Ges. 1879-80, p. 166; Radde's Faun. Casp.-Geb. 1886, p. 73; Zool. Jahrb. iii. 1888, p. 938;

<sup>1</sup> Giorn. Viagg. Egitto, &c. 1841-43.

<sup>2</sup> ii. cap. 74.

<sup>3</sup> Iter Palæst. p. 32.



ERYX JACULUS.  
♀, Abbasiyeh, Cairo.





- Boulenger, Bull. Soc. Zool. France, 1887, p. 532; Trans. Linn. Soc. ser. 2, Zool. v. 1889, p. 101; Trans. Zool. Soc. xiii. 1891, p. 143; Proc. Zool. Soc. 1891, p. 631; Cat. Snakes B. M. i. 1893, p. 125; Bedriaga, Bull. Soc. Nat. Mosc. 1879, pt. 2, p. 44; Lortet, Arch. Mus. Hist. Nat. Lyon, iii. 1883, p. 183; Tristram, Western Palestine, Rept. & Batr. 1884, p. 146; Slater, Snakes Ind. Mus. 1891, p. 6; Méhely, Zool. Anz. 1894, no. 442, p. 83; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 118; Werner, Zool. Garten, xxxvii. 1896, p. 85; Anderson, Herpet. Arabia & Egypt, 1896, pp. 70, 106.
- Eryx turcicus*, Daud. Hist. Rept. vii. 1803, p. 267, pl. lxxxv. fig. 2; Oppel, Ord. Fam. Gatt. Rept. 1811, p. 57; Gray, Ann. Phil. new ser. x. 1825, p. 210; Boie, Isis, 1826, p. 982; Fitz. Neuc. Class. Rept. 1826, p. 54; Eichw. Zool. Spec. iii. 1831, p. 176; Faun. Casp.-Cauc. 1841, p. 99, pl. xvii. figs. 1-3; Reuss, Mus. Senck. i. 1834, p. 132.
- Anguis helluo*, Pallas, Zoogr. Ross.-As. iii. 1811, p. 54.
- Eryx turcica*, Merr. Syst. Amph. 1820, p. 85; Boie, Isis, 1827, p. 513.
- Tortrix miliaris*, Merr. Syst. Amph. 1820, p. 82.
- Tortrix gracilis*, Merr. op. cit. p. 83.
- Tortrix colubrina*, Merr. op. cit. p. 83.
- Pseudoboa turcica*, Schneider, Denksch. Ak. Wissensch. München, vii. 1821, p. 129.
- Boa tatarica*, Licht. in Eversm. Reise, 1823, p. 146; Verz. Doubl. Berl. Mus. 1823, p. 104.
- Eryx du Delta*, Is. Geoff. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 42, pl. vi. fig. 2.
- Eryx familiaris*, Eichw. Zool. Spec. iii. 1831, p. 176.
- Eryx miliaris*, Eichw. op. cit. p. 176.
- Tortrix eryx*, Schlegel, Phys. Serp. pt. gén. 1837, p. 129; pt. descrip. p. 14, pl. i. figs. 11-13 (exclus. syn.).
- Erix turcica*, Fiedler, Reise durch Griechl. i. 1840, p. 20, ii. 1841, p. 331 & p. 364.
- Eryx*, sp. ?, Gervais, Ann. Sc. Nat. (3) x. 1848, p. 205.
- Eryx jaculus*, var. *teherana*, Jan, Iconogr. Gén. 1865, p. 73; de Filippi, Viag. Pers. 1865, p. 355.
- Eryx jaculus*, var. *miliaris*, Boettger, Zool. Jahrb. iii. 1888, p. 938.
- 1 ♂. Belim. Surgeon Lieutenant-Colonel J. G. Rogers, D.S.O., C.M.G.
- 1 ♂. Mahallet el Kebir. George Kent, Esq.
- 1 ♀. Abbasiyeh. Major-General H. M. L. Rundle, D.S.O., C.M.G.
- 2 ♀. Abu Roash.
- 2 ♀. Gizeh.
- 1 ♂. Heluan.
- 1 ♂. Neighbourhood of Cairo.

Scales on the upper surface of the head smooth, larger than in the previous species; rostral large, with an angular labial border; nasals, internasals, and some scales behind them much enlarged compared with *E. thebaicus*; 5 to 7 scales between the eyes above; 7 to 14 scales round the eyes (9-10 Egypt); 2 or 3 scales between the nasal and the eye; 1 or 2 scales between the eye and the upper labials; 10 to 14 upper labials (10 or 11 Egypt). Mental groove present. 40 to 51 scales round the body, anteriorly smooth, feebly keeled posteriorly. 165 to 200 ventrals, somewhat narrower than those of *E. thebaicus*; anal 1; subcaudals 15-34. Tail short, obtusely conical.

General colour pale reddish brown or greyish brown, with numerous smaller and more broken-up spots than in *E. thebaicus*, of a dark brown or purplish-brown colour, irregular in their arrangement, more or less anastomosing, and somewhat transverse in their disposition, and smallest on the sides; a forwardly curved, dark brown band between the eyes anteriorly, a similar band from the eye to the angle of the mouth, and usually two short, narrow, parallel, similarly coloured lines on the nape. Underparts yellowish white.

It attains to a total length of 695 millim., of which the tail measures 45 millim.

*Measurements (millim.) and other details of E. jaculus, Hasselq. & Linn.*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Scales between eyes.	Scales round eyes.	Scales between eyes & labials.	Scales between eyes & nasals.	Upper labials.	Mental groove.	Locality.
?	530	45	184	1	22	48	7	10	1	3	11	Present.	{ Egypt(type), Stockholm Museum.
?	390	32	193	1	19	48	7	11	1	3	11	"	" " "
♀	390	23	197	1	18	46	7	10	1	3	10	"	Beltin.
Juv.	213	16	194	1	20	45	7	10	1-2	3	10	"	Mahallet el Kebir.
♀	495	41	187	1	24	50	7	9	1	2	11	"	Abbasiyeh, Cairo.
♀	695	45	199	1	18	46	7	10	1-2	3	10	"	Abu Roash.
♀	612	46	194	1	..	47	8	10	1	3	10	"	" "
♀	465	40	181	1	25	45	7	9	1-2	3	11	"	Gizeh.
♂	372	35	187	1	25	47	8	11	1	3	10	"	"
♀	455	34	192	1	22	43	7	10	2	3	11	"	Heluan.
♂	500	37	200	1	23	51	..	10	1	3	10	"	{ Neighbourhood of Cairo.
?	....	..	185	..	23	45	7	13	..	4	13	"	Askabad.
?	....	..	179	..	24	45	7	12-13	..	4	12	"	"
♀	....	..	180	..	27	49	8	13-14	..	5	14	"	"
Juv.	....	..	188	..	21	47	9	13	..	4	12	"	{ Pul-i-Khatun, Transcaspia.
♂	....	..	183	..	21	45	8	11	..	4	11	"	Ilisk, E. Turkestan.
♀	....	..	185	..	20	43	9	12-11	..	4	11-10	"	" "
Juv.	....	..	172	..	20	45	9	10	..	3-4	10-11	"	" "
<i>Eryx elegans, Gray. (Type.)</i>													
♀	....	..	184	..	24	36	7	9	1	3	10	"	Afghanistan.

This species apparently does not extend into Middle Egypt. It is very plentiful in the delta proper and is the common species around Cairo. It is distributed over Northern Africa, from Lower Egypt to the confines of Morocco, if not to Morocco itself, to the Ionian Islands, South-east Europe, South-west and Central Asia.

I have included in the foregoing table the type specimen of the species, and 7 examples from the extreme eastern limit of its range, viz. from Turkestan. It will be seen that in that area the head-scales and upper labials are more numerous than in the typical form.

In 7 out of 11 Egyptian examples of the species there are more than 190 ventrals, the highest number being 200, while only 4 have fewer than 190, the lowest number being 181.

Among the 7 snakes in the table, and 5 others with more numerous head-scales from Turkestan and the Afghanistan confines of Turkestan, not recorded, only one has more than 190 ventrals, but the number is high, viz. 200. Eight of them have more than 180 ventrals, and three have fewer, the lowest being 172.

In examples of the typical form from beyond Egypt the ventrals vary from 165 to 187. The lowest number, 165, has been met with in the two extremes of its distribution, viz., in the island of Corfu and on the western slopes of the Kopet Dag, but in Persia 187 occurs. The snakes of the islands of Corfu and Xanthus are markedly distinct from the Egyptian specimens of this species in the relatively low number of their ventrals. In not one out of 9 examples are there more than 177 ventrals, while in a single specimen there are only 163.

The subcaudals do not exceed 25 in any of the specimens of the typical form from Egypt, their range being from 18 to 25; and practically a nearly similar number prevails in Turkestan, where the subcaudals, as yet reported, vary from 19 to 27; but at Bala Murghab, in Afghanistan, the numbers rise to 33. In the typical form found in Xanthus and in Persia as many as 34 are present.

I have also given in the table the details regarding *Eryx elegans*, Gray, from Afghanistan, which is distinguished from *E. jaculus* only by its somewhat larger and less numerous body-scales, which do not exceed 36 in number, whereas the lowest number hitherto reached in *E. jaculus* is 40; but as Afghanistan becomes better known it seems probable, in view of the already known range of variability of the body-scales of this species, that individuals will be met with that will bridge over the gap between 36 and 40.

Hasselquist, in his original description of *Anguis cerastes*, considered it to be the *Cerastes* (horned viper) of Prosper Alpinus; but, so far from this being the case, his *Cerastes* was an *Eryx* with artificial horns, consisting of the claws of some bird introduced on to the head, over the orbits. During Duméril and Bibron's day the Paris Museum possessed examples of this species (*E. jaculus*) the heads of which bore similar false horns firmly implanted and with the skin of the snake perfectly adhering to them.

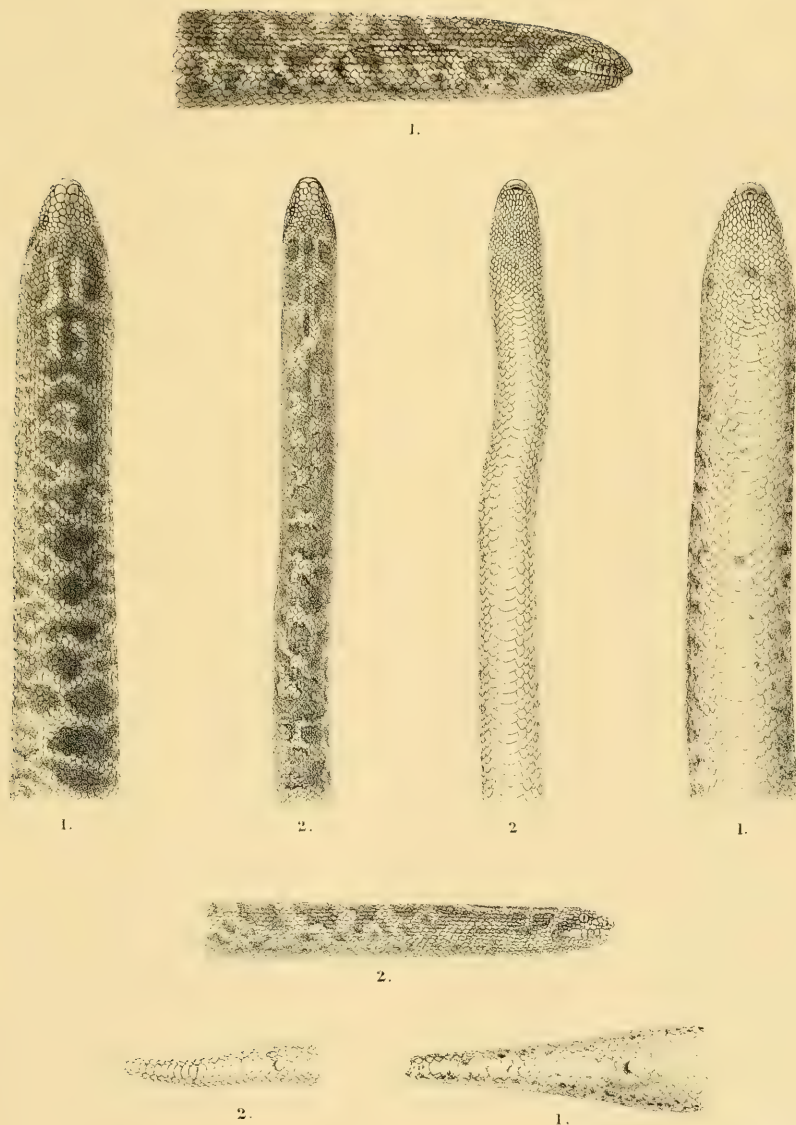
I have never seen any *Eryx* so treated, but the deception of giving false horns to hornless specimens of *Cerastes cornutus*, so as to enhance their value, has come under my observation. What was supposed to be a fine horned example of that viper was forwarded to me alive in London; but the horns, instead of being its own, were the spines of the hedgehog of the delta, *Erinaceus auritus*, firmly fixed into the head, one over each eye.

The snake described as *Anguis jaculus* in the 'Iter Palæstinum' had 186 ventrals and 23 subcaudals. In the 10th ed. of the Syst. Nat. (1758) Hasselquist is mentioned as having described it in the foregoing work; but the subcaudals are returned not as 23, but as 18. In the Mus. Adolph. Frid. Prod. ii. 1764, p. 48, and in the 12th ed. of the Syst. Nat., the ventrals and subcaudals are quoted as in the original description. The Stockholm Museum received two specimens of *Anguis jaculus* from the King's Museum, and in Quensel's MS. Catalogue they are entered as having come from it, and it is stated that they were the type specimens of the species; but in the 'Iter Palæstinum,' and also in the 12th edition of the 'Systema Naturæ,' only one snake is described, its ventrals and subcaudals being as stated above. The question arises, which of the two specimens is the type? One is a fully adult individual, with a total length of 53 centim., and the other is half-grown, with a maximum length of 39 centim. The former has 184 ventrals and 22 subcaudals, and the latter 193 ventrals and 18 subcaudals. The total length of the type specimen is given by Linnæus in the Syst. Nat. as 2 feet, which may be taken as roughly representing the length of the larger of the two specimens; and as its ventrals and subcaudals practically agree with the numbers given in the 'Iter Palæstinum' and in the 'Systema Naturæ,' it may be accepted as the type of the species. The circumstance that 18 subcaudals occur in the 10th edition of the Syst. Nat. suggests, in view of that number being present in the smaller specimen, that the latter was possibly then in existence and thus may have given rise to the difference in the notation of the subcaudals mentioned above.

I have to express my great indebtedness to Professor Smitt for the many facilities he accorded to my artist on his visit to the Stockholm Museum for the purpose of figuring the few Linnean types still preserved there that have a direct bearing on the fauna of Egypt, for all the information he has so freely given me regarding them, and for his kind permission to reproduce in this work figures of the types of *Anguis jaculus*<sup>1</sup>, *Coluber situla*, and *C. jugularis*. The type of *A. cerastes* appears to have been lost.

<sup>1</sup> It was not my intention to have figured the type of this well-known species unless the types of *A. colubrinus* and *A. cerastes* had been forthcoming; but as Mr. Smit had drawn the two specimens mentioned above together on one stone, I have reproduced his drawings as a plate rather than lose the result of his labours.





P.J.Smit del et lith.

ERYX JACULUS.

Fig. 1. Egypt. Hasselquist. Type. Stockholm Museum.

Fig. 2. Egypt. Stockholm Museum.





## COLUBRIDÆ.

## Series A. AGLYPHA.

COLUBRINÆ<sup>1</sup>.

## TROPIDONOTUS.

*Tropidonotus*, Kuhl, in Férussac, Bull. Sc. Nat. ii. 1824, p. 81.

Body cylindrical, elongate; head flattened, distinct from the neck; tail elongate; nostril between two plates; a loreal always present; head-shields regular; eye moderate, large, or rarely small; pupil round. Body-scales usually with apical pits, ovately lanceolate, imbricate, carinate, rarely smooth, in longitudinal series; ventrals broad, rounded; subcaudals divided; anal entire or divided; maxillary, palatine, and mandibular teeth present, the maxillary teeth short anteriorly, long posteriorly.

Until within the last few years it was not known that the members of this genus were possessed of a poisonous secretion for the destruction of their prey; but, so long ago as 1787, Fontana stated that they were immune to the bite of the viper and to the subcutaneous injection of its poison<sup>2</sup>. MM. Phisalix and Bertrand<sup>3</sup> have fully verified this assertion, as they injected a small example of *T. natrix* (50 cm. long) with 0.005 gr. of dry venom of the viper, a dose capable of destroying 15 to 20 guinea-pigs, but which had no effect on the snake. They then set themselves to discover the cause of this immunity. After the explanation they had already given of the immunity enjoyed by the toad and viper to their own poisons, it seemed to them rational to search in the blood of *Tropidonotus* for toxic substances analogous to echidnine. They accordingly extracted antiseptically, under the influence of chloroform, blood from the hearts of *T. natrix* and *T. viperinus*, two species closely allied to *T. tessellatus*, and injected very minute quantities either of the serum only or of the blood itself into the peritoneal cavity of guinea-pigs, with the invariable result that death ensued in little more than two hours, preceded by all the symptoms attending poisoning by the blood or venom of the viper. To ascertain the source of this poison in the blood of these snakes, they attempted to discover it by the successive inoculation of guinea-pigs with organic extracts of the principal viscera—liver, pancreas, spleen, thymus, thyroid body, and salivary glands. Injections of preparations of the first five of these organs into the peritoneal cavity had no evil effect. This, however, was not the case with the injection of the liquid extract of the salivary glands (superior

<sup>1</sup> Blgr. Faun. Brit. Ind., Rept. 1890, p. 279.

<sup>2</sup> It seems to be established that venomous serpents are protected against their own venom, but it does not appear that they are immune to the venom of snakes generically distinct from themselves. Mr. Thomson, Head-Keeper of the Zoological Gardens, informs me of two cases that illustrate this—the first in which *Elaps fulvus* killed *Vipera berus* and *Lachesis atrox*, and the second in which *Bungarus fasciatus* destroyed by its bite *Diemenia nuchalis*.

<sup>3</sup> C. R. Ac. Sc. 1894, pp. 76–79.

labial glands), as they, in every case, gave rise to symptoms of poisoning exactly the same as those produced by the blood of the two snakes, and were attended with the same result. MM. Phisalix and Bertrand's experiments show that the toxic principles of the blood of these snakes is derived from the internal secretion of the superior labial glands, and that the physiological and chemical similarity of the principles to echidnine explains the immunity of these snakes to the venom of the viper. Their experiments also establish that these serpents are in no sense harmless in so far as their prey is concerned.

The discovery of venom secreting-glands in the Aglypha and in Opisthoglypha fully confirms Mr. Boulenger's conclusion that the taxonomic division of Snakes into poisonous and non-poisonous, which he was the first to abandon, was erroneous<sup>1</sup>. The late Prof. Cope accepted this decided advance on the old classification.

TROPIDONOTUS TESSELLATUS, Laur. (Plate XXXIV. fig. 1.)

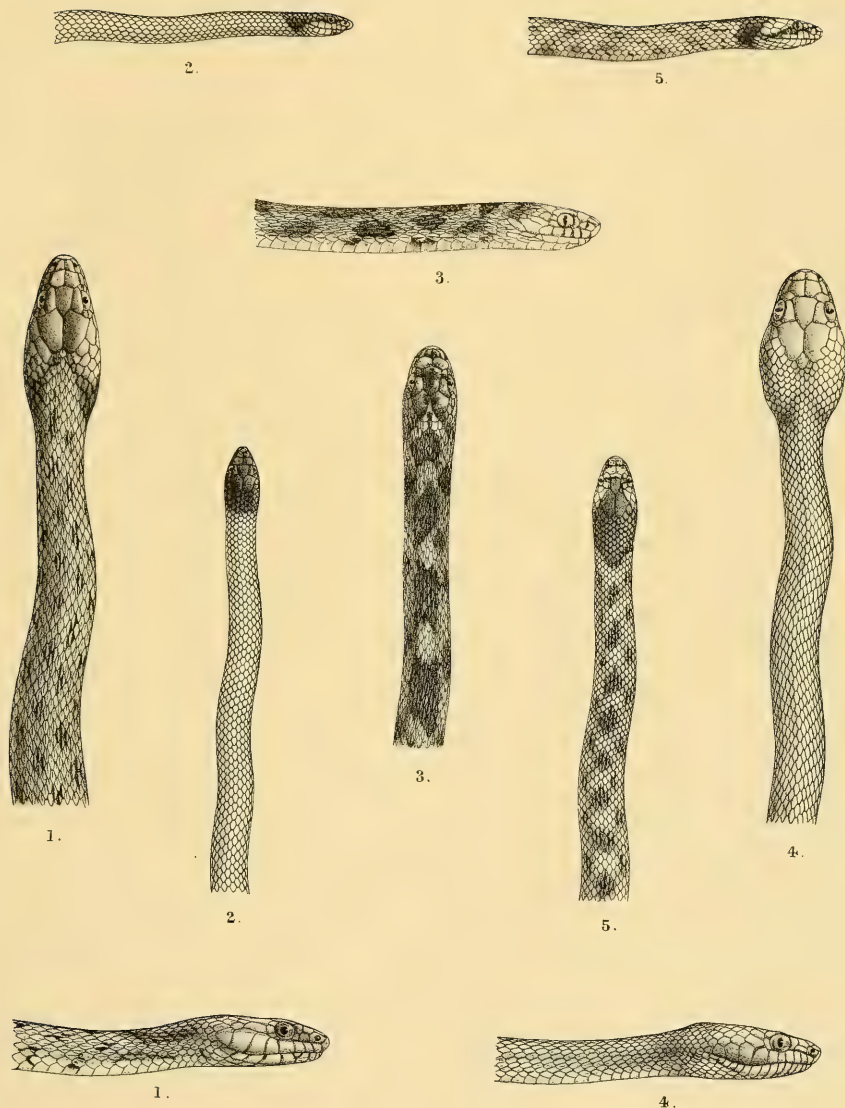
*Tropidonotus tessellatus*, Blgr. Cat. Snakes B. M. i. 1893<sup>2</sup>, p. 233, & iii. 1896, p. 605; Steindachner, Novara Exped., Reptiles, 1867, p. 66; Boettger, Zeitschr. ges. Natur. (Giebel), xlix. 1877, p. 287; Ber. Senck. nat. Ges. 1878-79, p. 64; S.B. Ak. Berl. 1888, p. 176; F. Müller, Verh. naturf. Ges. Basel, vi. 1878, p. 602; Carruccio, Bull. Soc. Zool. Rom. i. 1892, pp. 42 & 45; Werner, Verh. zool.-bot. Ges. Wien, xlii. 1892, p. 355; Mehely, Zool. Anz. xvii. no. 442, 1894, p. 84; Peracca, Boll. Mus. Zool. Anat. Comp. Torino, ix. 1894, no. 167, p. 11; Ferreira, Jorn. Ac. Sc. Lisboa, (2) iv. 1895, p. 42; Anderson, Herpet. Arabia & Egypt, 1896, p. 106.

1 ♀. Belim. Surgeon Lieutenant-Colonel J. G. Rogers, D.S.O., C.M.G.

Rostral broader than high, visible on the upper surface of the head. Eye moderately large. Nasal generally partially divided, in contact with the first and

<sup>1</sup> Mr. Boulenger (Proc. Zool. Soc. 1896, p. 614) has shown that, so far as the jaws and teeth are concerned, a nearly complete filiation can be traced between the *Colebriidæ Aglyphæ* and the *Proteroglyphæ* on the one hand, and between the former and the *Viperidæ* on the other hand. The following is the commentary of M. Phisalix confirming this opinion from a physiological standpoint:—"La découverte des glandes venimeuses suivie de l'étude du venin et du sang, chez les couleuvres, a apporté à cette manière de voir l'appui d'une vérification expérimentale. Le venin et le sang de la couleuvre possèdent en effet les mêmes propriétés physiologiques que le venin et le sang de la vipère, d'une part, et d'autre part, le venin et le sang des Protéroglyphes (cobra, ophiophage) déterminent des symptômes d'empoisonnement complètement différents de ceux de l'envenimation vipérique. Si l'on ajoute à cela que le venin de couleuvre atténué par la chaleur ou inoculé à dose non mortelle devient un vaccin contre le venin de vipère et que les glandes labiales de la couleuvre, à l'égal de celles de la vipère, vaccinent aussi contre son venin, on sera convaincu qu'il y a non seulement *homologie*, mais encore *analogie* entre ces glandes, et que la parenté entre les colubridés aglyphodontes et les viperidés peut être admise comme définitivement établie."—*C. R. Soc. de Biol.* sér. 10, iii. 1896, p. 965.

<sup>2</sup> As Mr. Boulenger has given the synonymy of this species, I have not done more than add a few additional references. A similar course has been followed with some of the remaining species.



J. Green del et lith.

*TROPIDONOTUS TESSELLATUS*. Fig. 1 ♀, Beltim (Delta).

*DASYPALTIS SCABRA*. Fig. 3 ♀, The Fayum.

*OLIGODON MELANOCEPHALUS*. Fig. 2 ♀, Merom, Syria.

*TARBOPHIS OBTUSUS*. Fig. 4 ♀, Mahallet el Kebir.

*MACROPROTODON CUCULLATUS*. Fig. 5 ♂, Abukir.





second upper labials; internasals triangular, as long as broad, with a narrow, truncated, anterior edge, shorter than the nasals and little more than half the size of the præfrontals; mesial suture of the præfrontals about one half the length of the frontal, which equals the distance between its anterior border and the tip of the snout; lateral borders of the frontal nearly straight, its anterior breadth equal to about two-thirds of its length; parietals large, rounded posteriorly, about one-fourth longer than the frontal, their length equal to the conjoint mesial length of the frontal and præfrontals; loreal as long as deep or longer, in contact with two præoculars; two, rarely one, or three præoculars, the upper excluded from contact with the frontal; occasionally a subocular; two to four postoculars; temporals 1+2; eight upper labials, rarely seven; fourth, rarely third, or fourth and fifth below the eye; anterior chin-shields the shorter, in contact generally with five or rarely four lower labials. 19 rows of strongly keeled scales around the body, with the exception of the outer row, which is feebly keeled or smooth. Ventrals 160-197; anal 1/1; subcaudals 48-86.

Olive-grey or olive-brown, with small dark spots arranged in an irregularly quincunciate manner, with a dark, more or less defined **A**-mark behind the parietals. Under surface yellowish or reddish, spotted or checkered with black, or almost wholly black.

*Measurements (millim.) and other details of T. tessellatus, Laur.*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Sub-oculars.	Præ-oculars.	Relation of præ-oculars to frontal.	Post-oculars.	Temporals.	Nasals.	Loreal.	Locality.
♀	645	115	168	1/1	57	19	8	4th	0	2	B. Ex. <sup>1</sup>	4	1+2	1	1	Beltim.

This species, which was first recorded from Egypt by Peters <sup>2</sup> in 1863, was obtained for me from Beltim, halfway between Damietta and Rosetta. Professor Boettger, in 1878-79, was probably correct in doubting its existence in Algeria, although he was aware that examples said to have come from Egypt were preserved in the Berlin and Vienna Museums. In 1892, however, it was again reported from Algeria by Dr. F. Werner.

It is found in Palestine and Syria, throughout South-western and Central Asia, South, Eastern, Southern, and Middle Europe, and seemingly along the North-African coast.

It is very aquatic in its habits, and lives chiefly on fish and batrachians.

Dr. Innes informs me that it is known to the natives of the delta as *عزرد بيتي* = *azroud beiti*, but I doubt its being found in houses.

<sup>1</sup> B. Ex. = broadly excluded.

<sup>2</sup> Mon. Berl. Ak. 1863, p. 370. I am indebted to Mr. Boulenger for this obscure reference.

## ZAMENIS.

*Zamenis*, Wagler (*part.*), Syst. Amph. 1830, p. 188.

Head distinct from the neck; body cylindrical, elongate. Eye of moderate size; pupil round; generally one or more suboculars, two præoculars and two postoculars, these plates occasionally form a semicircle to the lower half of the eye. Body-scales with apical pits, smooth or slightly keeled; ventrals rounded, or with an indistinct lateral keel; anal generally divided. Subcaudals two-rowed. Maxillary teeth increase in length posteriorly in continuous series, or the last two separated by a short interspace from the others. Mandibular teeth either of equal length, or the anterior teeth somewhat enlarged.

Dr. Alcock and Mr. Finn<sup>1</sup>, of the Indian Museum, Calcutta, have recently recorded the presence of the subocular "poison-gland" in three species of this genus, viz. *Z. diadema*, *Z. karelinii*, and *Z. rhodorhachis*. In the first it is "very large" and in the last "large," while in the second it is twice the length of the eye. The natives (Afghan-Baluch tribes), according to Dr. Maynard, whose notes are quoted by Dr. Alcock and Mr. Finn, regard *Z. rhodorhachis* as poisonous, but he adds that the snakes he met with were not fierce.

The *adipose bodies* of the species of this genus occurring in Egypt are greatly developed in individuals caught between November and April.

## ZAMENIS GEMONENSIS, Laur. (Plate XXXVII. A. fig. 1.)

? *Coluber jugularis*, Linn. Syst. Nat. 1758, p. 255; Mus. Adolph. Frid. Prod. ii. 1764, p. 45; Syst. Nat. i. 1766, p. 387.

*Natrix gemonensis*, Laur. Syn. Rept. i. 1768, p. 76.

*Zamenis gemonensis*, Blgr. Cat. Snakes B. M. i. 1893, p. 395.

## Var. ASIANA, Boettger, Ber. Senck. nat. Ges. 1879-80, p. 151.

Body moderately slender; snout obtuse; rostral nearly as high as broad, the portion visible from above equal to about one-fourth of the distance between the tip of the snout and the frontal; internasals slightly longer than broad, or as broad as long, rounded anteriorly; præfrontals slightly longer than the internasals; frontal as long as the median suture of the parietals, longer than the distance between its anterior border and the tip of the snout, narrower or slightly exceeding the breadth of the

<sup>1</sup> Journ. As. Soc. Beng. (new ser.) lxx. pt. ii. no. 4, 1896 (1897), p. 163.

supraocular, its anterior breadth equal to about two-thirds of its length; parietals equal in length to the frontal and about two-thirds of the præfrontal; loreal longer than high; one præocular (rarely two), generally broadly excluded from contact with the frontal; one small subocular; two or three postoculars; eight upper labials, the fourth and fifth entering the orbit; temporals 2+2 and 2+3; anterior chin-shields rather large, in contact with five, or occasionally only four, lower labials; second pair of chin-shields separated by small scales. 17-19 rows of smooth scales. 190-250 ventrals, with a very feeble angular ridge; anal 1/1; subcaudals 87-130. From Mr. Smit's description of the Stockholm specimen it is nearly uniformly coloured dark above with a very few light spots here and there, but covered with a fine, almost invisible white dotting.

The species, according to Mr. Boulenger, attains to 1790 millim. in length, of which the tail forms 500 millim.

This variety is distributed throughout Palestine, Syria, Asia Minor, Rhodes, and Cyprus.

Linnæus, in the 10th ed. of the Syst. Nat., in his account of the contents of the Museum Adolphus Frederick, and in the 12th ed. of the first-named work, described a snake under the name of *Coluber jugularis*, and gave Egypt as the country whence it came, and Hasselquist as the collector. As has been already stated, what is believed to be the type specimen of this species is preserved in the Museum of Stockholm. The bottle in which it is contained has the original Linnean label still attached to it, and, besides, the specimen is entered in Quensel's Catalogue (1802), and also in Swartz's (1808), under the name of *C. jugularis*, and in them it is further stated that it is the type of the species, and that it originally belonged to the Museum of King Adolphus Frederick.

Linnæus described his type specimen as having 195 ventrals and 102 subcaudals, but, in the professed type, Mr. P. J. Smit assures me that he counted 203 ventrals and 104 subcaudals. This difference of 8 ventral shields is considerable, and it is noteworthy that there is nothing like the same discrepancy between the subcaudals, which are much more difficult to count. To admit of the acceptance of this specimen as the type of *C. jugularis* would be to attribute an error of notation to Linnæus. The fact, however, that the specimens from the King's Museum that were transferred to Stockholm have been the subjects of many catalogues from Quensel's time onwards renders it possible that a specimen or a label may have become wrongly placed. As the specimen itself has no label attached to it, such an error may have happened, and, moreover, the custom appears to have been to tie the labels to the bottles only with thread. Anyway, the discrepancy between the ventrals does not admit of the unhesitating acceptance of the specimen's claim to be the actual type of *C. jugularis*; but whatever view may be taken of this, it is unquestionably an example of the snake generally known as *Zamenis viridiflavus*, as was pointed out to me by Prof. Smitt at

the time I first asked him regarding the Linnean types, and identified by Mr. Boulenger with the *Natrix gemonensis*, Laurenti.

Mr. P. J. Smit's notes on the specimen in question mention that the anal is divided, that there are 19 rows of scales round the body, and that the specimen has a total length of 132 cm., of which the tail forms 37 cm.

As Mr. Smit made a figure of the specimen, I have reproduced his drawing on the above mentioned plate.

The interest that *C. jugularis* had to me was the fact that it was one of Hasselquist's specimens, and that it was ascribed by Linnæus to Egypt. No other museum, so far as is known, contains a single example of this species from Egypt, and, moreover, I have met with only one other reference in literature to its presence in Egypt, namely, by Duméril and Bibron<sup>1</sup>, who mention that they had seen in Paris a living specimen that had been collected in Egypt, and that it was of a beautiful ebony-black colour.

ZAMENIS DAHLII, Fitz. (Fig. 10 text.)

*Coulevre*, Savigny, Descr. de l'Égypte, Rept. Suppl. pl. iv. (1813) figs. 41-43.

*Tyria dahlia*, Fitz. N. C. Rept. 1826, p. 60.

*Zamenis dahlia*, Dum. & Bibr. vii. 1854, p. 692; Blgr. Cat. Snakes B. M. i. 1893, p. 397.

Body long, slender; head rather narrow; snout obtuse; rostral nearly as high as broad, little visible on the upper surface of the head; internasals shorter than the præfrontals, equal or nearly equal to them in length; frontal longer than the distance between its outer border and the tip of the snout, slightly narrower or somewhat broader than the supraocular, its anterior breadth equal to about two-thirds of its length; parietals considerably longer than the frontal, obliquely truncated posteriorly; loreal oblong; one præocular, generally in contact with the frontal; one subocular; two postoculars; temporals 1+2, 1+3, 2+2 or 2+3; eight upper labials, the fourth and fifth entering the orbit, occasionally the fifth and sixth; anterior pair of chin-shields in contact with four or five lower labials, posterior pair the longer, separated by small scales. 19 rows of smooth narrow scales across the body, each scale with an apical pit. 205-218 markedly angulate ventrals; anal 1/1; subcaudals 98-132.

Colour greyish or olive-brown above, more or less tinged with reddish; on the sides of the neck and trunk, more especially anteriorly, with sparsely distributed rather large dark brown or nearly black spots, margined with whitish or pale yellow; upper surface of the head olive-brown, the nape of the neck with a dark collar broadly margined with yellowish, the anterior pale border being continuous with the pale yellowish area

<sup>1</sup> Erpét. Gén. vii. 1854, p. 688.

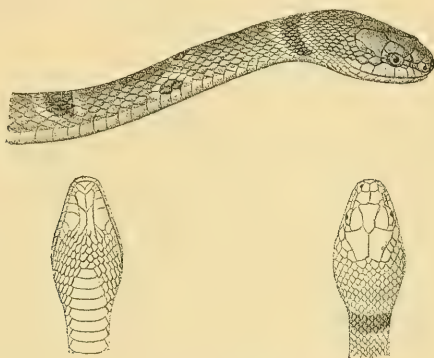


of the upper labials, post- and præoculars. Under surface pale yellowish without spots.

It attains to a length of 1080 millim., of which the tail forms 340 millim.

In the great French work on Egypt the snake represented on Suppl. pl. iv. (1813) figs. 4<sub>1</sub>-4<sub>3</sub> is unquestionably a good figure of this species, which is not uncommon in Southern Europe, east of the Adriatic, and in South-western Asia. It has frequently been recorded from Syria and Palestine, but beyond the fact that the following unnamed figure occurs in the 'Descr. de l'Égypte,' leading to the supposition that the species is

Fig. 10.



*Zamenis dahlia*, Fitz.

Reproduced from Plate iv. fig. 4 (1813) of Reptiles (Supplement), Descr. de l'Égypte.

present in Egypt, not a single specimen, so far as I have been able to ascertain, has ever been recorded from that country before or since the day, in 1801, when Savigny and E. Geoffroy St.-Hilaire left the harbour of Alexandria for France. I have made very careful inquiries after it, but with no success. It may be very rare, or it may be confined to a limited area of N.E. Egypt, and thus have escaped observation; but as four out of the six species of snakes figured on Suppl. pl. iv. have been found in Egypt, there is a reasonable expectation that it also will be rediscovered, and in order to facilitate its identification I have reproduced above a sufficient portion of Savigny's drawing to admit of the species being recognized by anyone who may be fortunate enough to find it.



## ZAMENIS RHODORHACHIS, Jan. (Plate XXXV.)

*Zamenis rhodorhachis*, Blgr. Cat. Snakes B. M. i. 1893, p. 398; op. cit. iii. 1896, p. 623; Ann. Mus. Civ. Genova, (2) xvi. (xxxvi.) 5 Giugno, 1896, p. 553; op. cit. (2) xvii. (xxxvii.) 7 Gennaio, 1897, p. 279; Werner, Verh. zool.-bot. Ges. Wien, xlv. 1895, p. 17; Anderson, Herpet. Arabia & Egypt, 1896, pp. 51, 106; Alcock & Finn, Journ. As. Soc. Bengal, (new ser.) lxv. 1896 (1897), pt. ii. p. 563.

*Zamenis ventrimaculatus*, non Gray, Günther, Proc. Zool. Soc. 1864, p. 489.

*Zamenis ladaccensis*, Slater, Cat. Snakes Ind. Mus. 1891, p. 27; Boettger, Ber. Offenb. Ver. xxix.-xxxii. 1892, p. 62.

*Zamenis ladaccensis*, var. *subnigra*, Boettger, Zool. Anz. 1893, no. 416, p. 118; no. 417, p. 132.

*Zamenis rhodorhachis*, Anderson, Proc. Zool. Soc. 1895, p. 654.

1 ♀. Beni Hassan.

1 juv. Tel el Amarna.

Body elongate and slender; head and snout rather narrow and pointed; the depth of the rostral nearly equals its breadth, the portion visible from above is equivalent to about a third of the interval between the rostral and the frontal; internasals as long as, or nearly as long as, the præfrontals, quadrangular, with the anterior border more or less rounded or anteriorly and externally divergent; præfrontals distinct; frontal considerably longer than its distance from the end of the snout, nearly twice as long as broad anteriorly, sides deeply concave, in contact more or less with the præocular; parietals moderately long, their extreme length exceeding the conjoint length of the frontal and præfrontals; supraocular one-third narrower than the anterior border of the frontal; loreal generally longer than deep; one præocular; one subocular, rarely absent; two postoculars; temporals 2+2 or 2+3; nine upper labials (rarely and asymmetrically 10), the fifth and sixth, or rarely the fourth, fifth, and sixth entering the orbit. Scales smooth, in 19 rows across the body. Ventrals 213-262, feebly angulate; anal 1/1; subcaudals 113-154.

Olive-grey, with about 95 dark, narrow, closely set cross-bars on the anterior two-thirds of the trunk, the posterior third and the tail uniform olive-grey. Upper surface of the head with obscure cross markings, occasionally a dark temporal band and a dark spot below the eye; the præ- and postoculars yellow or orange-yellow, and an area before the dark temporal band of the same colour; the angles of the ventrals generally with a dusky spot. Underparts white or pale yellowish white. In some (Persian specimens) there is a pinkish vertebral line.

It attains to a length of 1167 millim., of which the tail forms 297 millim.

The two specimens here recorded were obtained on the margin of the desert in the localities mentioned.

It has a wide distribution. Besides Egypt, it has been found in Somaliland, and outside of Africa it extends to Arabia, Syria, Persia, Transcaspia, and North-western India.



ZAMENIS RHODORHACHIS.  
♀, Beni Hassan.



Wilkinson in his MS. notes mentions a long thin harmless snake under the name of the flyer (!Arabic name "Jear" or "Jeier"), on account of its habit "of bounding from rocks or along the sand of the desert to the distance of 12 to 15 feet or more"! This *Zamenis* and the next species are distinguished by great rapidity of movement and by the wonderful way they pass from stone to stone in the desert, so that it has occurred to me that one or other of them might be the snake Wilkinson had in view; but the distances he gives were doubtless derived from native sources and grossly exaggerated.

In the following table I have included some specimens from the Hadramut, Aden, and Somaliland, as the numbers of ventrals are in remarkable contrast to those found in the two Egyptian specimens. It is noteworthy that in the Somaliland snakes the prevailing numbers are low, like those found on the opposite coast of the Straits of Aden.

*Measurements (millim.) and some details of Z. rhodorhachis, Jan.<sup>1</sup>*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Sub-oculars.	Pre-oculars.	Relation of preoculars to frontal.	Postoculars.	Temporals.	Lores.	Locality.
♀	870	250	262	1/1	140	19	L. 9 R. 9	5 & 6	1	1	B. C.	2	2+2	1	Beni Hassan.
Juv.	555	156	257	1/1	154	19	9	4, 5, 6	0	1—1	B. C.	2	2+2	1	Teile Amarna.
♂	1010	..	226	1/1	..	19	L. 10 R. 9	5 & 6	1	1	C.	2	2+3	1	Hadramut.
♂	1167	297	227	1/1	129	19	9	5 & 6	L. 1 R. 0	1—1	B. C.	2	2+3	1	"
♀	780	215	228	1/1	125	19	9	5 & 6	1	1	B. C.	2	2+3	1	"
♀	561	161	226	1/1	125	19	9	5 & 6	1	1	B. C.	2	2+3	1	"
♂	1068	262	231	1/1	114	19	9	5 & 6	1	1	B. C.	2	2+2	1	Aden.
	Snout to vent.														
♀	786	..	221	1/1	..	19	9	5 & 6	L. 1 R. 0	1	B. C.	2	2+3	1	"
	Total length.														
♀	793	218	226	1/1	120	19	9	5 & 6	1	1	B. C.	2	2+2	1	"
Juv.	540	155	226	1/1	133	19	9	5 & 6	1	1	B. C.	2	2+3	1	"
Juv.	430	120	222	1/1	128	19	9	5 & 6	1	1	B. C.	2	2+2 2+3	1	"
Juv.	348	91	229	1/1	127	19	9	5 & 6	1	1	C.	2	2+3	1	Zaila, Somali-land.
			213	1/1	118	19	..	..	..	..	..	..	..	..	Ogaden (Boettger).

<sup>1</sup> Explanation of abbreviations :—L.=Left; R.=Right; B. C.=Broadly in contact; C.=In contact; 0=Not in contact.

Below I have also given an analysis of the numbers of the ventrals and subcaudals that have been recorded, by Mr. Boulenger and others, from Asiatic as well as Egyptian specimens. The materials, however, are so limited that little is learned from them; but, at the same time, it will be observed that the lowest number of ventrals in the Egyptian specimens is greater than the maximum number from any other localities, with the exception of Midian and the Sinaitic Peninsula, and that their highest number exceeds by 16 the greatest number yet recorded from any other area besides North-western Arabia. The numerical contrast presented by the Egyptian and Somaliland snakes is very striking, as their respective lowest numbers are 248 and 213, and their highest 262 and 229.

*An Analysis of the numbers of ventrals and subcaudals of Z. rhodorhachis, Jan, recorded from the areas indicated below.*

	Ventrals.	Subcaudals.	Ventrals.	Subcaudals.
1. North-west India.....	243- ?	135	225-246	129-145
2 ♀. Bagti Hills .....	232-246	133-145		
2. Gilgit .....	225-244	129-131		
2 ♀. Ai Dara, W. slope of Kopet Dagħ ..	223-244	113- ?	214-244	113-137
1 juv. Baluchistan .....	215	135		
4 ♂, 1 ♀, & 1 juv. Persia .....	214-228	125-137		
7 ♂, 7 ♀, & 7 juv. East and South Arabia..	....	....	220-239	114-140
1 ♀. Dead Sea .....	....	...	225	124
2. N. Arabia, Midian, and Tor .....	....	....	251-252	139- ?
2 ♀ & 1. Egypt .....	....	....	248-262	140-154
2. Somaliland .....	....	....	213-229	118-127

Besides *Z. rhodorhachis* three other species of this genus are present in Somaliland, viz. *Z. brevis*, Blgr.<sup>1</sup>, *Z. somalicus*<sup>2</sup>, Blgr., and *Z. smithi*<sup>3</sup>, Blgr., the last being also present in Gallaland.

ZAMENIS ROGERSI, Anderson. (Plate XXXVI.)

*Zamenis rogersi*, Anderson, Ann. & Mag. Nat. Hist. ser. 6, vol. xii. Dec. 1893, p. 439; Herpet. Arabia & Egypt, 1896, p. 107; Blgr. Cat. Snakes B. M. iii. 1896, p. 623.

1 ♂. Above Wadi Hoaf, near Heluan. Mrs. Anderson.

1 ♂. Beltim, sea-face of the delta. Surgeon Lieutenant-Colonel J. G. Rogers, D.S.O., C.M.G.

1 ♀ and 1 juv. Shaluf, on the Freshwater Canal, near Suez.

1 ♀. Marsa Matru.

<sup>1</sup> Ann. Mus. Civ. Genova, (2) xv. (xxxv.) 1895, 30 Marzo, p. 13, pl. iii. fig. 3.

<sup>2</sup> *Op. cit.* (2) xvii. (xxxvii.) 18 Nov. 1896, p. 11.

<sup>3</sup> Proc. Zool. Soc. 1895, p. 536, pl. xxx. fig. 2.





ZAMENIS ROGERSI.  
♂, Belim, Delta.



Body elongate, somewhat shorter and stouter than *Z. rhodorhachis*; head also slightly broader and snout less pointed; depth of the rostral equals about half of the breadth, the portion visible from above equals about one-third of the interval between the rostral and the frontal; internasals as long or nearly as long as the præfrontals, quadrangular, the anterior borders more or less rounded, or anteriorly and externally divergent; præfrontals sometimes confluent; frontal considerably longer than its distance from the end of the snout, its anterior breadth about three-quarters of its length, sides deeply concave, in contact slightly with the præocular; parietals rather broad, their extreme length nearly equalling the conjoint frontal and præfrontals; supra-ocular one-third narrower than the anterior border of the frontal; loreal longer than deep; one præocular; one subocular, rarely two; two postoculars; temporals 2+2, rarely 2+3; nine upper labials, the fifth and sixth entering the orbit, occasionally only the sixth. Scales smooth, in 19 rows. Ventrals 19-21, feebly angulate; anal 1/1; subcaudals 95-106.

General colour greyish or yellowish; a longitudinal dorsal series of about 60, olive-brown, rounded spots along the two anterior thirds of the body, more or less confluent posteriorly in some, alternating in lateral series of smaller spots close to the angles of the ventrals; the posterior third of the body and the tail uniform yellowish. Head uniform brown above, with a dark oblique temporal band and another behind it, a black spot below the eye and another behind the nostril; the areas between these four dusky markings are more or less bright yellowish orange. Under surface yellowish white. A dusky spot occupies the angle of every third or fourth ventral, and there are occasionally a few obscure small dusky spots between the angles of the ventrals and their keels.

It attains to a length of 845 millim., of which the tail forms 220 millim.

It has hitherto been recorded only from Lower Egypt, and from the most western part of its sea-board, viz. Marsa Matru.

*Measurements (millim.) and some details of Z. rogersi, Anders.*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Sub-oculars.	Præ-oculars.	Relation of præoculars to frontal.	Post-oculars.	Temporals.	Loreal.	Locality.
♂	317	76	198	1/1	95	19	9	5 & 6	1	1	B. C.	2	2+2	1	Wadi Hoaf.
♂	845	220	197	1/1	105	19	9	6	2	1	B. C.	2	2+2	1	Beltim.
♀	565	205	201	1/1	96	19	9	5 & 6	1	1	B. C.	2	2+2	1	Shaluf.
Juv.	298	101	200	1/1	97	19	9	5 & 6	1	1	B. C.	2	2+3	1	"
♀	690	190	215	1/1	106	19	9	5 & 6	1	1	B. C.	2	2+2	1	Marsa Matru.

This snake is closely allied to *Z. rhodorhachis*, Jan, but differs from it in its body being less slender, the number of ventral and subcaudal shields falling below the range that occurs in that species, in which the former shields vary from 213 to 262 and the latter from 113 to 154, whereas in *Z. rogersi* the ventrals, in five specimens, range only from 197 to 215, and the subcaudals from 95 to 106. It is also distinguished from *Z. rhodorhachis*, Jan, by the rostral shield being considerably broader than high, as its height only equals about one-half of its breadth; whereas in *Z. rhodorhachis* the height of the rostral equals two-thirds of its breadth or even more. The frontal is considerably longer than the interval between its anterior margin and the end of the snout. In the other details of its head-shields, with the exception of the præfrontals, which are occasionally united into one shield (two specimens from Shaluf, near Suez), and in the number of scales round the body it resembles *Z. rhodorhachis*.

*ZAMENIS FLORULENTUS*, Is. Geoffr. St.-Hil. (Plate XXXVII. fig. 1.)

? *Coluber guttatus*, Forskål, Descr. Anim. 1775, p. 14.

? *Coluber cahirinus*, Gmel. Linn. Syst. Nat. i. 1788, p. 1115.

*Couleuvre*, Savigny, Descr. de l'Égypte, Suppl. Rept. pl. iv. (1813) figs. 31-33.

*La Couleuvre à Bouquets*, Is. Geoff. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 146, pl. viii. figs. 2 & 2'.

*Coluber florulentus*, Is. Geoff. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 151; Schlegel, Phys. Serp. ii. 1837, p. 166.

*Zamenis florulentus*, Dum. & Bibr. vii. 1854, p. 693; Jan, Icon. Gén. livr. 48, 1876, pl. vi. fig. 4; Klunzinger, Zeitschr. Ges. Erdk. Berl. xiii. 1878, p. 95; F. Müller, Verh. nat. Ges. Basel, vi. 1878, p. 599; op. cit. vii. 1882, p. 145; Reichenow, S.B. Ges. nat. Freunde Berl. 1883, p. 149; Blgr. Cat. Snakes B. M. i. 1893, p. 402; op. cit. iii. 1896, p. 624; Anderson, Herpet. Arabia & Egypt, 1896, p. 107; Francaviglia, Boll. Soc. Rom. Zool. v. 1896, p. 35.

*Zamenis ventrimaculatus*, part., Günther, Cat. Snakes B. M. 1858, p. 105.

*Zamenis dahlui*, part., Günther, op. cit. p. 107.

*Tylanthera florulenta*, Cope, Trans. Am. Phil. Soc. xviii. new ser. 1896, p. 205.

- |                |   |
|----------------|---|
| 1 ♀.           | Beltim. Surgeon Lieutenant-Colonel J. G. Rogers, D.S.O., C.M.G. |
| 1 ♂.           | Mandara.  |
| 2 ♂ and 4 ♀.   | Abu Roash.  |
| 1 ♂ and 1 juv. | Gizeh.  |
| 1.             | Fayum.  |
| 2 ♂ and 2 juv. | Minia.  |
| 1 ♀.           | Tel el Amarna.  |
| 1 juv.         | Assiut.   |
| 2 ♂ and 2 juv. | Luxor.  |
| 1 juv.         | Karnak.   |
| 1 ♀.           | West bank of Nile, Luxor.                                       |



1.



3.



2.



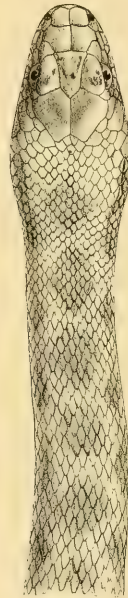
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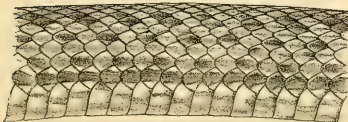
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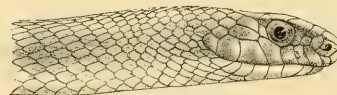
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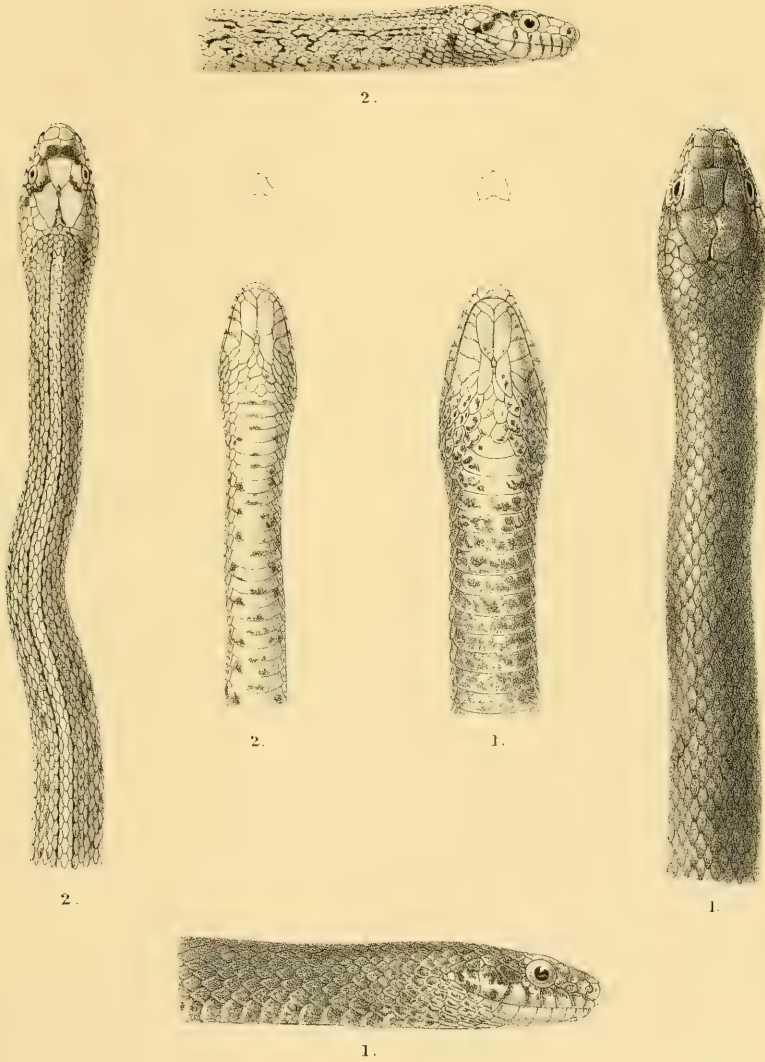
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J. Green del et lith.

ZAMENIS FLORULENTUS. Fig. 1 ♂, Abu Roash. ZAMENIS RAVERGIERI, var., NUMMIFER. Fig. 2 ♂, Beltim (Delta).  
LYTORHYNCHUS DIADEMA. Fig. 3 ♂, Gizeh. CELOPELTIS MONSPESSULANA. Fig. 4 ♂, Maryut District; Fig. 5 ♂, var., Alexandria.







F.J. Smit del. et lith.

*COLUBER JUGULARIS*, Linn. Fig. 1. Type, Hasselquist, Stockholm Museum.  
*COLUBER SITULA*, Linn. Fig. 2. Type, Hasselquist, Stockholm Museum.



1 ♀ and 1 juv. Assuan.  
 1 ♂ and 1 ♀. Wádí Halfa.  
 1 juv. Tokar.

Body somewhat slender and elongate; head rather long; snout long, obtusely rounded; eye moderately large; rostral considerably broader than high, the part visible from above equal to one-fourth or more of the interval between the rostral and the frontal; internasals nearly as broad as long, triangular, truncated anteriorly, forming a more or less transverse suture with the præfrontals; præfrontals longer than the internasals; frontal as long or slightly longer than the distance between its anterior border and the tip of the snout, its anterior breadth equals about two-thirds of its length, its anterior breadth much broader than a supraocular; parietals shorter than the conjoint lengths of the frontal and præfrontals, obliquely truncated posteriorly; loreal longer than deep; one præocular, in contact with the frontal, rarely two asymmetrically; one subocular, exceptionally two or three; two postoculars, exceptionally three; nine upper labials, rarely ten, generally the fifth and sixth entering the orbital margin, occasionally the sixth and seventh; temporals 2+2 or 2+3; four lower labials, usually in contact with the first chin-shield; posterior chin-shields as long or longer than the anterior pair, very narrow, and separated by scales. 21 rows of smooth scales, exceptionally 23. Ventrals 201-228, laterally angulate; anal 1/1; subcaudals 82-104.

Olive-brown above, nape and anterior part of the body with narrow transverse dark bands prolonged downwards on to the sides, not unfrequently more or less interrupted in the mesial line, and anteriorly separated from each other by interspaces about half their antero-posterior breadth; further back they assume the character of brown rounded spots arranged quincuncially, but frequently the last fourth of the snake is uniform olive. Upper surface of the head generally with a series of dark transverse markings, sometimes edged with white, a prominent one across the anterior part of the parietals to the temporal region, from which a dark irregular marking passes to the angle of the mouth; a dark band below the eye, more or less developed; centres of labials dusky. Under surface yellowish or coral-red, each ventral generally with a black spot on its angle, these spots becoming feeble on the hinder part of the body. Sometimes the entire upper surface of the snake is nearly uniform brown.

It attains to a length of 1090 millim., of which the tail forms 220 millim.

This is probably the most common serpent in Egypt. It is found on the margin of the desert and on the alluvium, and in and about villages, entering the houses.

It extends along the Nile valley from the sea-face of the delta to Sennaar. It has been recorded from Cyrenaica in the west. Parenti and Picaglia mention its occurrence on the coast of the Red Sea, at Aden<sup>1</sup>; but the correctness of their identification seems doubtful.

<sup>1</sup> Rett. ed Anf. Mar Rosso, 1886, p. 45.

*Measurements (millim.) and other details of Z. florulentus, Is. Geoff. St.-Hil.*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Sub-oculars.	Pre-oculars.	Relation of pre-oculars to frontal.	Post-oculars.	Temporals.	Locality.
♀	930	217	217	1/1	99	21	L. 9 R. 10	L. 5, 6 R. 5, 6, 7	1	1	B. C.	2	2+2	Beltin.
♂	1028	..	215	1/1	..	21	9	5, 6	1	1	"	2	2+2	Mandara.
♂	759	185	213	1/1	93	21	9	L.— R. 5, 6	1	1	"	2	L. 2+2 R. 2+3	Abu Roash.
♂	917	149	210	1/1	..	23	L. 9 R. 10	L. 5, 6 R. 6, 7	1	1	"	2	2+2	"
♀	707	160	221	1/1	92	21	9	5, 6	1	1	"	L. 3 R. 2	2+2	"
♀	710	180	217	1/1	82	21	9	5, 6	1	1	"	2	2+2	"
♀	733	190	216	1/1	86	21	L. 10 R. 9	L. 6 R. 5, 6	1	1	"	2	2+2	"
♀	874	202	222	1/1	100	21	L. 10 R. 9	L. 6 R. 6	L. 3 R. 3	L. 1 R. 2	"	2	2+2	"
♂	854	200	209	1/1	88	21	9	5, 6	1	L. 2 R. 1	"	2	2+2	Gizeh.
Juv.	335	72	220	1/1	88	21	9	5, 6	1	1	"	2	2+2	"
?	610	136	209	1/1	92	21	9	5, 6	1	1	"	2	2+2	Fayum.
♂	..	..	206	1/1	..	21	9	5, 6	1	1	"	2	2+2	Minia.
♂	718	180	205	1/1	93	21	9	5, 6	1	1	"	2	2+2	"
Juv.	368	85	206	1/1	98	21	9	5, 6	1	1	"	2	2+2	"
Juv.	335	80	208	1/1	101	21	9	5, 6	1	1	"	2	2+2	"
♀	780	217	211	1/1	95	21	9	5, 6	1	1	"	2	L. 2+3 R. 3+2	Tel el Amarna.
Juv.	305	..	214	1/1	..	23	10	5, 6	1	1	"	2	L. 2+2 R. 2+3	Assiut.
♀	613	127	212	1/1	94	21	9	5, 6	1	1	"	2	L. 3+2 R. 2+2	Luxor.
♀	730	180	212	1/1	97	21	9	5, 6	1	1	"	2	2+2	"
Juv.	340	83	210	1/1	104	21	9	5, 6	1	1	"	2	2+2	"
Juv.	315	..	211	1/1	..	21	9	5, 6	1	1	"	2	2+2	"
Juv.	320	76	208	1/1	97	21	9	5, 6	1	1	"	2	2+2	Karnak.
♀	810	197	213	1/1	99	21	9	5, 6	1	1	"	2	2+2	W. bank of Nile, Luxor.
Juv.	318	76	217	1/1	103	21	9	5, 6	1	1	"	2	2+2	E. bank of Nile, Luxor.
♀	803	180	211	1/1	87	21	9	5, 6	L. 2 R. 2	1	"	2	L. 2+3 R. 2+3	Assuan.
Juv.	415	95	215	1/1	95	21	9	5, 6	1	1	"	2	2+2	"
♀	1000	240	217	1/1	93	21	?	5, 6	?	?	?	..	?	Wādī Halfa.
♂	780	200	208	1/1	103	21	?	?	?	?	?	..	?	" "
Juv.	415	100	217	1/1	104	23	9	5, 6	1	1	B. C.	2	L. 2+3 R. 2+2	Tokar.



*Analysis of foregoing Table.*

Largest male 1028 millim.		Largest female 1000 millim.
Highest number of ventrals	222 ♀.	Abu Roash.
" "	caudals 104 juv.	Luxor and Tokar.
Lowest number of ventrals	205 ♂.	Minia.
" "	caudals 82 ♀.	Abu Roash.
Range of ventrals	205-222=17.	
" "	of caudals	82-104=22.
Highest number of scales	23.	Abu Roash, Assiut, and Tokar (3 specimens).
Lowest " "	21.	Egypt and Eastern Sudan (26 specimens).
7 males, 11 females, 10 juv., and 1 sex ?.		

I have found *Mus orientalis* in the stomach of an example of this species.

Its native name is جداري = *gidari*, which means "belonging to walls."

The most interesting of the specimens in the table on p. 258 are the male from Abu Roash and the young from Assiut and Tokar, each of which has 23 rows of scales across the body. Other slight variations occur, all of which are indicated in the table, except one, viz. the transverse division of the fifth upper labial, complete on one side of the head, but incomplete on the other, in a female from Assuan.

It will be observed that in the eighth specimen on the list the eye is surrounded on one side of the head by the præocular, three suboculars, and two postoculars, thus excluding any of the upper labials from entering the orbital rim on that side.

## ZAMENIS RAVERGIERI, Ménétr.

*Coluber ravergeri*, Ménétr. Cat. Rais. 1832, p. 69.

*Coluber maculatus* (non Merr.), Dwigubsky, Nat. Hist. Russ., Amph. 1832, p. 26.

*Zamenis caudolineatus*, part., Günther, Cat. Snakes B. M. 1858, p. 104; Proc. Zool. Soc. 1864, p. 489; Jan, Icon. Gén. livr. 23, 1867, pl. iii.; Anderson, Proc. Zool. Soc. 1872, p. 393.

*Periops caudolineatus*, Jan, Filippi's Viagg. in Persia, 1865, p. 355.

*Zamenis ravergeri*, Strauch, Mém. Ac. St. Pétersb. (vii.) xxi. no. 4, 1873, p. 128; Blanford, East.

Persia, Zool. ii. 1876, p. 417; Second Yarkand Exped. 1878, p. 22; Proc. Zool. Soc. 1881, p. 680; Blgr. Trans. Linn. Soc. ser. 2, Zool. v. 1889, p. 102; Cat. Snakes B. M. i. 1893,

p. 405; id. op. cit. iii. 1896, p. 625; Slater, Snakes Ind. Mus. 1891, p. 29; Méhely, Zool. Anz. 1894, p. 85; Peracca, Boll. Mus. Torino, ix. 1894, no. 167, p. 11.

*Zamenis fedtschenkoi*, Strauch, Mém. Ac. St. Pétersb. (vii.) xxi. 1873, no. 4, p. 135, pl. iv.

*Zamenis ravergeri*, var. *fedtschenkoi*, Boettger, Zool. Jahrb. Syst. iii. 1888, p. 927.

*Zamenis glazounowi*, Nikolski, Annuaire Ac. St. Pétersb. 1896, App. p. xiv.

Body moderately long; head broader in some than in others, occasionally depressed; snout broad, obtusely rounded; rostral considerably broader than high, the portion visible above nearly equal to one-third of the interval between the rostral and frontal; internasals quadrangular, nearly as large as the prefrontals, broadly in contact with the rostral; frontal as long as or longer than the interval between its anterior border and the tip of the snout, its anterior breadth equal to about two-thirds of its length and much broader than the supraocular; parietals equal to the frontal and one-third of the prefrontals, slightly truncate posteriorly, generally with a few enlarged scales external to them; loreal nearly quadrangular, not unfrequently with one or more separated off portions of the labials below it; two præoculars, the upper broadly in contact with the frontal, less so than in the variety *nummifer*; one subocular, rarely two; two postoculars (typical) and three postoculars (variety); temporals scale-like (typical), larger (variety); 9 upper labials, exceptionally 8 or 10, fifth and sixth entering orbit (typical) and fifth labial in variety, rarely 6 and 7 in the case of 10 labials. Anterior chin-shields in contact with five labials; posterior pair narrow and separated by scales. 21, rarely 23, rows of feebly keeled scales across the body (typical) and 23 to 25 in the variety. Ventrals more or less angulate, 190–222; anal divided (typical form), occasionally single in variety; subcaudals 75–101.

General colour greyish or yellowish, with transverse narrow brownish bands (typical form) or rhomboidal spots (variety) alternating with similarly coloured spots on the sides; the tail usually banded longitudinally, but occasionally with spots; under surface whitish or profusely black-spotted; head generally with a dusky streak below the eye and another from the eye to the angle of the mouth, sometimes almost wholly black.

The largest specimen recorded by Mr. Boulenger is 1330 millim. long, the tail forming 320 millim.

It is distributed over Turkestan, Afghanistan, Persia, and Transcaucasia.

Var. NUMMIFER, Reuss. (Plate XXXVII. fig. 2.)

*Couleuvre*, Savigny, Descr. de l'Égypte, Hist. Nat., Suppl. Pl. Rept. pl. iv. (1813) figs. 61-63.

*Coluber nummifer*, Reuss, Mus. Senck. i. 1834, p. 135.

*Coluber (Periops) nummifer*, Rüppell, Mus. Senck. i. 1845, p. 308.

*Zamenis hippocrepis*, nov. sp.? or juv. of var.?, Günther, Cat. Snakes B. M. 1858, p. 104.

*Zamenis caudælineatus*, part., Günth. Cat. Snakes B. M. 1858, p. 104; Tristram, West. Palest., Rept. & Batr. 1884, p. 144.

*Periops neglectus*, Jan, Elenco, 1863, p. 60; Icon. Gén. livr. 48, 1876, pl. iv. fig. 3; Steindach.

Unger & Kotschy's Inseln Cypren, 1865, p. 572; Gasco, Viagg. in Egitto, pt. ii. 1876, p. 116.

*Zamenis (Periops) neglectus*, Boettger, Zeitsch. ges. Nat. (Giebel) xlix. 1877, p. 286.

*Zamenis ravergeri*, Klunzinger, Zeitschr. Ges. Erdk. Berl. xiii. 1878, p. 95; Blgr. Ann. Mag. N. H. (6) ii. 1888, p. 506.

*Zamenis neglectus*, *caudælineatus*, &c., F. Müller, Verh. naturf. Ges. Basel, vi. 1878, p. 667.

*Zamenis ravergeri*, var. *nummifer*, Reuss, Boettger, Ber. Senck. nat. Ges. 1880, p. 154.

*Zamenis nummifer*, Blgr. Proc. Zool. Soc. 1891, p. 633; Cat. Snakes B. M. i. 1893, p. 407; id. op. cit. iii. 1896, p. 625; Peracca, Boll. Mus. Torino, ix. 1894, no. 167, p. 12; Anderson, Herpet. Arabia & Egypt, 1896, p. 107.

1 ♂. Beltim.

2 juv. Margin of desert, Heluan. Dr. Adalbert Fényes.

This variety is distinguished from the typical form more or less by the slighter extent in which the upper præocular plate is in contact with the frontal, so much so that the two are sometimes not in contact; by the frequent coalescence of the two præoculars, and by the presence generally of a third postocular produced by the upper portion of the sixth labial becoming cut off from the plate itself, so that this labial is excluded from the orbit; in such cases, as a general rule, only the fifth enters, but whenever only two postoculars are present the sixth enters the eye. The upper labials vary from 8 to 10, but these two numbers are very exceptional, 9 being almost universal. The temporals vary in size, but those of the first series are not so scale-like as in the typical form. The scales round the body are, as a rule, more numerous than in the Eastern snakes, as they vary from 23 to 25. There are 197-216 ventrals, and 74-101 subcaudals; the anal is sometimes single.

General colour pale pinkish grey or bright olive-grey, with a dorsal series of large, rounded, dark brown spots margined with darker, and a lateral series of smaller, similarly coloured, more or less quadrangular spots alternating with them; on the tail the dorsal and lateral spots are continued as three dark longitudinal lines. A large dark brown spot with darker margins on each side of the frontal and on each supraocular; a short,

oblique, dark band below the eye and a similar band from behind the eye to the angle of the mouth, and another on the temporal region; labials and chin-shields with dark margins. These head-markings are more or less obsolete in adults. Underparts yellowish white, obscurely clouded in some with greyish; the sides of the belly with a series of black spots.

Mr. Boulenger gives the following as the dimensions attained by the variety, viz.: total length 1030 millim., tail 230 millim.

It is present in Lower Egypt from Heluan to the Mediterranean coast, and beyond it ranges to Palestine, Syria, Asia Minor, and to the islands of Cyprus and Rhodes.

It is known in Egypt as *ارعم بيتي* = *ar' am beiti*.

Linnaeus described, under the name of *C. tyria*<sup>1</sup>, a snake which, we are informed, was collected by Hasselquist in Egypt, and that had 210 ventrals and 83 subcaudals. It has been conjectured by some herpetologists that it might possibly have been *Zamenis diadema*, while by others it has been referred with doubt to this variety of *Z. ravergeri*; but as the type specimen seems hopelessly lost, all speculation regarding it is useless.

On the fourth Supplementary Plate of Reptiles of the 'Description de l'Égypte,' bearing the date 1813, there is an excellent life-sized figure of an unnamed snake, of which no mention is made in the text, beyond indicating it and some others under the general term *Couleuvre*. Rüppell, in one of his journeys to Egypt (1821-1834), obtained a snake which Reuss identified with the foregoing figure and described as *C. nummifer*. It was also in the second decade of this century that James Burton (afterwards Haliburton), who sailed for Egypt in 1822, obtained his specimen, now preserved in the British Museum.

In 1878, Müller, of Basel, pointed out that the snakes from Cyprus and Beirût described by Jan in 1863 as *Periops neglectus* were identical with *Z. ravergeri*, Ménétr., and with the *Z. caudolineatus*, Günther; and a year or so later Professor Boettger, in dealing with a number of specimens from Syria and Palestine, agreed with Müller's identification, but advanced a further stage, and pointed out that the *C. nummifer*, Reuss, with which they corresponded, could only be regarded as a variety or local form of *Z. ravergeri*.

The accompanying table brings out clearly wherein they differ, and the details given in it appear to prove the correctness of Professor Boettger's conclusion. It will be

<sup>1</sup> It is difficult to conjecture what led Linnaeus to apply the term *tyria* to the snake in question. It is noteworthy that an old author \* says: "In Mari Mortuo Tyrus serpens invenitur, unde tiriaca conficitur." This substance was the preparation made from one of the Viperidae, and used as an antidote in snake-poisoning.

\* Breydenbachius, in 'Peregrinatione, &c.,' Mogunt., fol., 1486, quoted by Hermann, Obs. Zool. 1804, p. 284.

*Details relating to Z. ravergeri, Ménér.*

Sex.	Ventrals.	Anal.	Sub-caudals.	Scales.	Upper labials.	Labials entering orbit.	Sub-oculars.	Pre-oculars.	Relation of pre-oculars to frontal.	Post-oculars.	Temporals.	Loreals.	Locality.
♂	190	1/1	82	21	9	5 & 6	1	2	B. C.	2	2+3	1	Pul-i-Khatun, Transcaspia. Shiraz.
Juv.	192	1/1	89	21	9	5 & 6	1	2	B. C.	2	2+3	1	
♂	193	1/1	..	21	9	5 & 6	1	2	B. C.	2	2+3	1	Ain Dara, Kopet Dag.
♂	194	1/1	90	21	9	5 & 6	1	2	B. C.	2	L. 2+2 R. 2+3	1	Shiraz.
♂	197	1/1	85	21	9	5 & 6	1	2	B. C.	2	3+3	1	Tirphul.
♂	197	1/1	94	21	9	5 & 6	1	2	B. C.	2	2+3	1	Shiraz.
♀	201	1/1	95	21	9	5 & 6	1	2	B. C.	2	L. 3+2 R. 3+4	1	"
Juv.	201	1/1	84	21	9	5 & 6	1	2	B. C.	2	2+3	1	Old Gulran.
♂	202	1/1	101	21	9	5 & 6	1	2	B. C.	2	3+3	1	Dehhid, Persia.
♀	206	1/1	82	21	9	5 & 6	1	2	B. C.	2	2+3	1	Nuhar, Kopet Dag.
Juv.	206	1/1	86	21	10	6 & 7	2	2	B. C.	2	L. 2+3 R. 3+3	1	Pul-i-Khatun.
♀	209	1/1	93	21	L. 10 R. 9	L. 6 & 7 R. 5 & 6	1	2	B. C.	2	2+3	1	Kohrud, N. of Ispahan.
♀	211	1/1	82	23	9	5 & 6	1	2	B. C.	2	2+3	1	Karman, Persia.
♀	211	1/1	..	21	L. 9 R. —	L. 5 & 6 R. —	1	2	B. C.	2	2+3	1	Chin Kilak.
♀	216	1/1	89	21	9	5 & 6	1	2	B. C.	2	3+4	1	Zandra, Afghanistan.
Juv.	218	1/1	97	23	L. 10 R. 9	5 & 6	1	2	B. C.	3	L. 3+3 R. 3+4	1	Samarkand.
<i>Var. nummifer.</i>													
Juv.	197	1	89	23	9	5 & 6	1	2	B. C.	2	2+3	1	Rhodes.
Juv.	198	1	86	25	L. 10 R. 9	L. 6 R. 5	1	1	C.	3	2+3	1	Jerusalem.
	199	1/1	..	25	9	5 & 6	..	2 & 3	..	2	..	1	Jerusalem (Müller).
Juv.	199	1/1	..	23	9	5 & 6	1	2	B. C.	2	2+3	1	Asia Minor.
	202	1/1	..	23	9	5	1	1	C.	3	..	1	Gizeh, Egypt.
♂	203	1/1	88	23	L. 8 R. 9	5	1	1	B. C.	3	L. 2+2 R. 2+4	1	Egypt.
Juv.	203	1/1	101	23	9	5 & 6	1	2	B. C.	2	3+3	1	Xanthus.
♂	203	1/1	..	23	9	L. 4 & 5 R. 5	1	2	C.	3	L. 2+2 R. 2+3	1	Beltim, Egypt.
♂	204	1/1	79	23	9	5	1	1	B. C.	3	2+3	1	Cyprus.
	204	1	..	25	9	5	..	3 & 4	..	3	..	1	Beirût (Müller).



*Details &c. (continued).*

Sex.	Ven-trals.	Anal.	Sub-caudals	Scales.	Upper labials.	Labials entering orbit.	Sub-oculars.	Præ-oculars.	Relation of præ-oculars to frontal.	Post-oculars.	Temporals.	Loreals.	Locality.
♂	205	1/1	82	25	9	5	1	1	C.	3	2+3	1	Hiram's Tomb, Palestine.
	205	1/1	74	25	9	5	..	..	..	3	..	1	Egypt (Boettger).
♂	205	1	90	25	9	5	1	1	B. C.	3	2+3	1	Cyprus.
	205	1	..	25	9	5 & 6 5	..	2	..	2 & 3	..	2	Jerusalem (Müller).
♀	205	1	83	23	9	5	1	1	C.	3	L. 3+3 R. 3+5	1	Cyprus.
	206	1	..	25	8	5	..	2	..	3	..	1	Beirut (Müller).
♂	206	1	84	25	9	L. 5 R. 5 & 6	1	1	..	L. 3 R. 2	2+3	1	Cyprus.
	207	1/1	80	23	9	5 & 6	..	2	..	3	..	1	Jaffa (Boettger).
	209	1	82	25	9	5 & 6	..	2	..	2	..	1	Syria (Boettger).
Juv.	209	1	88	23	9	5	1	1	L. 0 R. C.	3	L. 2+2 R. 2+3	1	Cyprus.
	209	1/1	91	25	9	5 & 6	..	3-2	..	2	..	2-3	Jerusalem (Boettger).
	210	1	..	25	10	5 5 & 6	..	3	..	3 & 2	..	1	Saron, near Jaffa (Müller).
♀	210	1/1	86	25	9	5 & 6	1	1	C.	2	2+3	1	Jerusalem.
♀	210	1/1	82	25	9	5	1	2	B. C.	2	2+3	1	Nazareth.
Juv.	210	1/1	83	25	9	5	1	L. 1 R. 2	L. 0 R. C.	3	L. 2+2 R. 2+3	1	Heluan.
	210	1/1	..	25	9	L. 6 R. 5	1	2	C.	3	..	1	Gizeh, Egypt.
	211	1/1	77	25	9	5 & 6	..	3	..	2	..	2-1	Syria (Boettger).
	211	1/1	87	25	9	5	1	1	..	3	..	1	Egypt.
♂	211	1	84	25	9	5	1	2	C.	3	L. 2+3 R. 3+3	1	Cyprus.
	212	1/1	..	25	9	5 & 6	..	3	..	3	..	2 & 3	Jerusalem (Müller).
	212	1	..	25	9	5	..	2	..	3 & 5	..	1	Beirut (Müller).
	213	1/1	84	25	9	5	1	1	L. 0 R. 0	3	2+3	1	Heluan, Egypt.
	214	1/1	..	25	9	5	..	3	..	3	..	2 & 3	Jerusalem (Müller).
	214	1/1	84	25	9	5 & 6	..	3-2	..	2	..	1	Beirut (Boettger).
♀	215	1/1	86	25	9	5 & 6	1	L. 2 R. 1	B. C.	2	2+3	1	Cyprus.
Juv.	215	1/1	92	23	9	5 & 6	..	L. 4 R. 3	B. C.	2	2+3	1	Xanthus.
	216	1/1	83	23	9	5	..	2	..	3	..	1	Beirut (Boettger).

*Analysis of scaling of specimens recorded in foregoing Table.*

Highest number of ventrals, typical form,	218.	Samarkand.
" " " variety,	216.	Beyrut.
" " subcaudals, typical form,	101.	Debbid, Persia.
" " " variety,	101.	Xanthus.
Lowest number of ventrals, typical form,	190.	Pul-i-Khatun.
" " " variety,	197.	Rhodes.
" " subcaudals, typical form,	82.	Pul-i-Khatun.
" " " variety,	74.	Egypt.
Range of ventrals, typical form,	190-218=28.	
" " variety,	197-216=19.	
14 out of 16 specimens of typical form with 21 rows of scales.		
2 " 16 " " " "	23 " "	
12 " 37 " variety " "	23 " "	
25 " 37 " " " "	25 " "	
3 out of 8 Egyptian specimens of variety with 23 rows of scales.		
5 " 8 " " " "	25 " "	
1 " 11 Palestine " " "	23 " "	
10 " 11 " " " "	25 " "	
5 " 11 Syrian, Asia Minor, and Island of Rhodes specimens of variety . . .	23 " "	
6 " 11 " " " "	25 " "	
3 " 7 Cyprus specimens of variety with	23 " "	
4 " 7 " " " "	25 " "	
13 out of 16 typical specimens with 9 upper labials, 5 & 6 in orbit; 2 postoculars.		
1 " 16 " " 10 " 6 & 7 " 2 " "		Division of labial anterior to orbit.
1 " 16 " " $\frac{10}{9}$ " $\frac{6 \& 7}{5 \& 6}$ " 2 " "		" "
1 " 16 " " $\frac{10}{9}$ " 5 & 6 " 3 " "		
11 " 37 of variety with 9 " 5 & 6 " 2 " "		
2 " 37 " " 9 " 5 & 6 " 3 " "		
14 " 37 " " 9 " 5 " 3 " "		
1 " 37 " " 9 " 5 " 2 " "		
1 " 37 " " 9 " 5 " $\frac{3}{5}$ " "		
1 " 37 " " 9 " $\frac{6}{5}$ " 3 " "		
1 " 37 " " 9 " $\frac{4 \& 5}{5}$ " 3 " "		
1 " 37 " " 9 " $\frac{5 \& 6}{5}$ " $\frac{2}{3}$ " "		
1 " 37 " " 8 " 5 " 3 " "		
1 " 37 " " 9 " $\frac{5}{5 \& 6}$ " $\frac{3}{2}$ " "		
1 " 37 " " 10 " $\frac{5}{5 \& 6}$ " $\frac{3}{2}$ " "		
1 " 37 " " $\frac{8}{9}$ " 5 " 3 " "		
1 " 37 " " $\frac{10}{9}$ " $\frac{6}{5}$ " 3 " "		

observed that the extent of the suture formed by the præocular and the frontal is invariably broad in typical *Z. ravergeri*, and that in not a few cases in its variety *nummifer* the same character is present. Unfortunately a good many blanks occur under this column, as Dr. Müller and Professor Boettger, whose observations I have incorporated in the table, did not record the condition of that suture in the specimens they examined. The former naturalist did not apparently regard any of the shields before the eye as suboculars, and therefore when he spoke of 2 & 3 and 3 & 4 præoculars he, in all likelihood, had in the first of these examples a snake with one præocular on one side of the head, the result of the union of two shields, and a subocular below it; while on the opposite side there were two unamalgamated præoculars and a subocular below them. In the second instance, 3 & 4, there were doubtless two præoculars and a subocular on one side, and two præoculars, a subocular, and a separated-off portion of a labial lying alongside the latter. When he and Prof. Boettger enumerate two loreals, the second loreal was in all probability a small portion of a labial set free and lying in close relation to the loreal, a condition not uncommon in examples of this species. With these explanations it will be seen that all the specimens of var. *nummifer* are distinguished by one or two præoculars and by one loreal only, as in *ravergeri*. The table conclusively proves the specific identity of all the specimens that appear in it, but at the same time establishes the desirability of regarding the western snakes as constituting a variety distinguished by slight modifications of no great stability.

The number of the upper labials entering the orbit—*i. e.* whether they are the 5th, 5th & 6th, and so on—when the normal number 9 is present, depends chiefly on the circumstance whether a portion is separated off from the sixth labial or not; and when their number is increased or diminished, the number to be assigned to them depends, of course, on whether the increase is due to division of the labials before or behind the orbit, and the same holds good of reduction in the number 9 by amalgamation. There may also be union of the postoculars or division, and with these facts kept in view the variations recorded in the foregoing tables are easily explicable.



ZAMENIS DIADEMA.  
♂, Pyramids of Gizeh.

*W. B.*





## ZAMENIS DIADEMA, Schlegel. (Plate XXXVIII.)

*La Couleuvre aux raies parallèles*, Is. Geoffr. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ?1827, p. 47, pl. viii. (no date) figs. 1 & 1'.

*Coluber tyria*, Linn., *apud* Geoffr. St.-Hil. op. cit. p. 151.

*Zamenis diadema*, Blgr. Cat. Snakes B. M. i. 1893, p. 411; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 121; Peracca, Boll. Mus. Torino, 1894, no. 167, p. 12; Werner, Verh. zool.-bot. Ges. Wien, xlv. 1895, p. 18; op. cit. xlvii. 1897, p. 407; Anderson, Herpet. Arabia & Egypt, 1896, pp. 71, 107; Alcock & Finn, Journ. As. Soc. Beng. lxx. (April 12) 1897, pt. ii. p. 563.

1 juv. East side of Suez Canal, near Suez.

1. Fâÿid, west of Bitter Lakes.

1 ♂. Abu Roash.

3 ♂, 1 ♀, and 2 juv. Pyramids of Gizeh.

1 ♂ and 1 ♀. Beni Hassan. M. W. Blackden, Esq.

1 ♂ and 1 ♀. Tel el Amarna. Professor W. M. Flinders Petrie, D.C.L.

1 ♂. Suakin.

1 ♀. Durrur.

1 ♂. Oasis of Siwah. A. R. Birdwood, Esq.

Body elongate, somewhat compressed; rostral as high as broad, or nearly so, the portion visible from above equals about one-third the length of the internasals; internasals more or less quadrangular, shorter than the præfrontals, the suture between the two directed obliquely outwards and backwards; præfrontals generally broken up into a number of pieces; length of the frontal equalling or falling short of its distance from the end of the snout, its anterior breadth equals nearly two-thirds of its length, sides markedly concave, generally broadly in contact with the præocular, rarely excluded; parietals longer than the frontal, nearly twice as long as broad, rather narrow, their extreme length nearly equals the distance between the anterior angle and the end of the internasals, obliquely truncated posteriorly; supraocular about one-fourth narrower than the anterior border of the frontal; three to five loreals; two to four præoculars, occasionally only one; three to five postoculars; two to four suboculars between the eye and the labials; temporals scaly. Ten to thirteen upper labials; the sixth very exceptionally entering the orbit. Anterior pair of chin-shields large, in contact with five or six lower labials; posterior pair small, elongate, separated by three rows of scales. 25 to 33 rows of obtusely keeled scales round the body. 210-278 ventrals, with a more or less defined lateral ridge; anal 1; subcaudals 65-110.

General colour of upper surface reddish or greyish buff, or even sandy, with about 50 large, rhombic, dark brown spots on the body and about 25 on the tail, with a series of narrow oblong spots along the side alternate with the dorsal spots, quadrangular posteriorly and prolonged on to the tail; the lateral scales of the large



*Measurements &c. (in millim.) of Z. diadema, Schlegel.*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Suboculars.	Preoculars.	Relation of preoculars to frontal.	Postoculars.	Temporals.	Loreal.	Locality.
Juv.	375	64	222	1	75	27	12-11	0	3-3	L. 2 R. 2	B. C.	4-4	Scales	2	N.E. of Suez Canal.
♀	1170	240	242	1	75	29	13-13	0	3-3	3-3	B. C.	3-4	"	2	Fâïd, W. of Bitter Lakes.
♂	1317	222	227	1	75	27	12-12	0	4-4	2-2	B. C.	3-2	"	2	Pyramids of Gizeh.
♂	1290	230	221	1	71	29	12-10	0	3-3	3-4	B. C.	3-3	"	2	" "
♂	888	170	224	1	75	29	12-12	0	2-3	4-4	B. C.	4-4	"	2	Abu Roash.
Juv.	405	60	244	1	70	29	12-11	L. 6 R. 0	2-3	3-3	B. C.	4-4	"	2	Pyramids of Gizeh.
♀	745	127	233	1	71	31	12-12	0	4-3	4-3	B. C.	3-3	"	2	" "
Juv.	335	55	221	1	78	29	12-13	0	3-3	2-3	B. C.	4-4	"	2	" "
♀	1310	210	234	1	..	29	11-12	0	3-3	3-4	B. C.	3-3	"	2	Beni Hassan.
♂	1250	232	222	1	77	29	12-12	0	3-3	3-3	B. C.	4-3	"	2	" "
♂	1017	195	221	1	77	29	12-12	0	3-3	2-2	B. C.	4-4	"	2	Tel el Amarna.
♀	358	58	225	1	75	31	12-12	0	3-3	4-4	B. C.	3-3	"	2	" "
♂	931	160	227	1	71	29	11-11	0	3-3	3-3	B. C.	4-4	"	2	Suakin.
♀	873	148	236	1	72	27	11-10	0	3-3	2-3	B. Ex.	5-5	"	2	Durrur.
♂	1340	252	226	1	77	27	12-12	0	3-3	2-2	B. C.	4-4	"	2	Gizeh.
♂	655	145	218	1	74	29	12-12	0	4-4	4-4	B. C.	3-3	"	3	Oasis of Siwah.

*Table illustrating the variations of Z. diadema, Schlegel.*

Ventrals.	Subcaudals.	Scales.	
219-248	68-74	25-31	N.W. Africa, Tripoli, Tunisia, and Algeria.
218-244	70-78	27-31	N.E. Africa, Egypt.
227-236	71-72	27-29	Eastern Sudan.
238	78	27	N.W. Arabia.
224-236	85	25	S.E. Arabia.
211-226	73-80	25-27	Eastern Arabia.
230-248	80-86	25-31	Persia.
218-239	87-90	27	Baluchistan.
220-247	82-100	27-29	Afghanistan.
240-244	100-103	29-31	Sind.
239	110	29	Rajputana.
228-244	103-107	29-31	Punjab.
243	102	27	N.W. Provinces, India.
278	107	29	Kashmir (Gilgit).

I am indebted to Mr. Boulenger's Catalogue for the grouping of the following details by which it is possible to recognize the species of *Zamenis* met with in Egypt:—

*Synopsis of the Species.*

- I. Internasals and præfrontals distinct, not broken up.
  1. Scales in 19 rows (rarely 17, *Z. gemonensis*).
    - a. Frontal not or but slightly wider than the supraocular, more than once and a half as long as broad.
 

Præocular invariably excluded from frontal. Ventrals with indistinct lateral keel. Scales with two apical pits . . . . . *Z. gemonensis*.

Præocular usually in contact with frontal. Ventrals with distinct lateral keel. Scales with a single apical pit . . . . . *Z. dahlii*.
    - b. Frontals anteriorly considerably broader than the supraocular.
 

Height of the rostral nearly equal to its breadth. Ventrals 213-262; A. 1/1; S.C. 113-154 . . . . . *Z. rhodorhachis*.

Height of the rostral about half its breadth. Ventrals 195-215; A. 1/1; S.C. 95-105 . . . . . *Z. rogersi*.
  2. Scales smooth, in 21 rows, rarely 23. One præocular (rarely divided), with a subocular below it. Two labials entering orbit . . . . . *Z. florulentus*.
  3. Scales obtusely or faintly keeled, in 21 to 25 rows. One or two præoculars; one, rarely two suboculars. Two or only one labial entering orbit . . . . . *Z. ravergeri*.
- II. Præfrontals broken up into a varying number of pieces. 25 to 33 rows of keeled scales. No labials entering orbit, or very rarely so. Eye surrounded by scales. 3 to 5 loreals . . . . . *Z. diadema*.

## LYTORHYNCHUS.

*Lytorhynchus*, Peters, Mon. Berl. Ak. 1862, p. 272.

Body elongate, cylindrical; tail moderate or short; head scarcely distinct from the neck. Eye moderate, pupil slightly vertically elliptic. Rostral large, folded back on the upper surface of the head, and at a sharp angle laterally in front of the nasals, concave below. Nostril small, lateral, oblique, between two shields; one or more loreals. Body-scales 19, without apical pits, smooth or feebly keeled, in longitudinal and oblique series; ventrals angulate; anal divided or entire. Maxillary teeth few in number, posterior much longer than the anterior; mandibular teeth subequal.

Dr. Alcock and Mr. Finn have found the subocular (so-called) poison-gland well developed in the two species *L. ridgewayi* and *L. maynardi*.

## LYTORHYNCHUS DIADEMA, Dum. &amp; Bibr. (Plate XXXVII. fig. 3.)

*Lytorhynchus diadema*, Blgr. Cat. Snakes B. M. i. 1893, p. 415; König, Verh. (S.B.) nat. Verh. Bonn, 1892, p. 22; Matschie, S.B. Ges. nat. Fr. Berl. 1893, no. 1, p. 31; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 119; Anderson, Herpet. Arabia & Egypt, 1896, p. 107; Franca-viglia, Bull. Soc. Rom. Stud. Zool. v. 1896, p. 36.

*Heterodon (Lytorhynchus) diadema*, Klunzinger, Zeitschr. Ges. Erdk. Berl. xiii. 1878, p. 95.

1 ♂. West bank of Suez Canal, between Suez and Ismailia.

1 juv. Abu Roash.

1 ♂. Gizeh, margin of desert.

Head convex from before backwards; rostral abruptly transversely truncated, continued backwards in a line with the nostrils, sides of its lateral angulation free, thick, and more or less puckered, lateral margins of the upper portion more convex in some than in others, hardly separated from the præfrontals, its upper portion equalling the length of the internasals and præfrontals in the mesial line; internasal suture more than half the length of the præfrontal; præfrontals in contact with the internasals, posterior nasals, loreal, upper præocular, supraocular, and frontal; the latter rather short and broad, shield-shaped, its length equalling the distance of its anterior border from the tip of the snout; anterior nasal the larger; loreal square, larger in some than others, generally lying on the second and third labials, and occasionally in contact with the fourth as well. One or two præoculars, and occasionally a subocular; two postoculars; seven or eight upper labials, the fourth, the fifth, or the fourth and fifth entering the orbit. Generally three lower labials in contact with the anterior chin-shields, rarely four. Scales smooth. Ventrals 160-187; anal 1/1; subcaudals 36-46.



The general colour of the upper surface varies from reddish buff (Algeria), pale yellow (Egypt and Persia), to reddish brown (Syria); thirty-three to forty-one transverse, rhomboidal, dark brown spots on the back, the centres of the scales forming them generally paler than their margins, and some of the scales occasionally becoming nearly white; a few obscure dark spots on the sides alternating with the dorsal spots; eight to thirteen narrow dark cross-bars on the tail; an elongate, dark, longitudinal band from the frontal to the nape, occasionally enclosing one or two round white spots, and giving off anteriorly a narrow band between the eyes; an obscure, short, dark band below the eye, and another more or less prominent dark band from behind the eye to the gape; underparts white.

It attains to a length of 455 millim., of which the tail measures 60 millim.

It does not appear to be at all a common species in Egypt, throughout which, however, it must have a wide range, as Peters recorded it from Sennaar. It is found in localities presenting the most diverse physical characters—*e. g.*, the arid surroundings of the Pyramids of Gizeh and of Suez, the high elevated grassy plateau of Batna (3350 ft.), Algeria, under snow in winter, and Sennaar, where the heat is tropical. It extends also to Syria, Arabia, Persia, and Baluchistan.

The specimens here recorded were found under stones lying on loose sandy soil. Its food consists of small lizards.

I have not been able to discover its native name.

*Measurements &c. of L. diadema, Dum. & Bibr. (in millim.).*

Sex.	Snout to vent.	Tail.	Ventrals.	Caudals.	Upper labials	Labials entering orbit.	Sub-oculars.	Præ-oculars.	Relation of præoculars to frontal.	Temporals.	Loreal.	Locality.
♂	363	72	168	40	8	5	1	2	B. Ex.	2+2	1	West of Suez Canal.
Juv.	166	29	163	42	8	5	1	2	B. Ex.	L. 2+3 R. 2+2	1	Abu Roash.
♂	361	64	164	40	8	5	1	2	B. Ex.	L. 2+3 R. 2+2	1	Pyramids of Gizeh.
♀	75	65	181	43	8	5	L. 1 R. 0	1	B. Ex.	L. 2+2 R. 1+2	1	Maskat, Arabia.
♀	395	60	187	36	8	4 & 5	1	1	B. Ex.	L. 2+3 R. 2+2	1	Bushi, S. Persia.
♂	359	66	161	44	8 <sup>1</sup>	5	1	L. 2	B. Ex.	1+1	1	Algeria.
♀	348	..	172	..	8	4 & 5	0	1	B. Ex.	2+2	1	Ain Sefra, Algeria.
	380	68	164	40	8	5	1	2	..	..	1	Jaffa ( <i>Boettger</i> ).
	233	43	162	39	8	5	1	2	..	..	1	" "
	383	60	169	38	8	4 & 5	..	..	..	..	1	" "

<sup>1</sup> Partially divided on left side.

It will be observed that the Arabian and S. Persian snakes are seemingly distinguished by a larger number of ventrals than those from other localities, but it is quite probable that, with additional materials, the supposed difference may disappear.

In a specimen from Ain Sefra, Algeria, lent to Mr. Boulenger by Professor Doumergue, the upper portion of the rostral is not so rounded posteriorly as in the Egyptian specimens; but in another, also from Algeria, although this part of the rostral is considerably injured, the form of its outline is much the same as in the Egyptian snakes. There are slight differences in the relative dimensions of the internasals and præfrontals, but they are too unimportant to call for any more attention than this passing remark. In the typical form from Algeria there may be one or two præoculars, and a subocular may be present or absent. In a specimen from Bushi in Southern Persia there is one præocular and one subocular; and on one side of the head, in an example from Maskat, there is the same arrangement, but on the opposite side of the head the latter shield is absent, as is the case in a specimen from Ain Sefra. In Egyptian specimens and in others from Jaffa there are two præoculars and one subocular, or, if the latter be regarded as præocular, then there are three præoculars as stated by Boettger; the size of the loreal also varies, it being larger in some than in others. Only in one instance among the specimens that have come under my observation have four labials been in contact with the first pair of chin-shields. It is from the neighbourhood of the Suez Canal.

COLUBER<sup>1</sup>.

*Coluber, part.*, Linn. Syst. Nat. i. 1766, p. 375.

"Maxillary teeth 12 to 22, subequal in size; anterior mandibular teeth longest. Head distinct from neck, elongate; eye moderate or rather large, with round pupil; loreal sometimes absent. Body elongate, cylindrical or feebly compressed; scales smooth or keeled, with apical pits, in 15 to 35 rows; ventrals rounded or angulate laterally. Tail moderate or long; subcaudals in two rows."—*Boulenger*.

## COLUBER SITULA, Linn. (Plate XXXVII. A. fig. 2.)

*Coluber situla*, Linn. Syst. Nat. i. 1758, p. 223; Mus. Adolph. Frid. Prod. ii. 1764, p. 44; Syst. Nat. 12th ed. i. 1766, p. 385.

*Coluber quadrilineatus*, Pallas, Zoogr. Ross.-As. iii. 1811, p. 40.

*Coluber trilineatus*, Metaxa, Monogr. Serp. Rom. 1823, p. 44 note.

*Coluber leopardinus*, Bonap. Faun. Ital. p. & pl. unnumbered, 1834, fig. 1; Blgr. Cat. Snakes B. M. ii. 1894, p. 41.

*Coluber cruentatus*, Steven, Bull. Soc. Imp. Nat. Mosc. viii. 1835, p. 317, pl. 9 (var.  $\beta$ ).

*Callopeltis leopardinus*, Bonap. Mem. Ac. Tor. (2) ii. 1839, p. 432; Nordmann in Demidoff, Voy. Russ. Mérid. iii. 1840, p. 348, pls. vi., viii., & ix.

*Ablabes quadrilineatus*, Dum. & Bibr. vii. p. 319.

*Natrix leopardina*, Cope, Proc. Ac. Philad. 1862, p. 338.

*Coronella quadrilineata*, Jan, Arch. Zool. Anat. Fis. ii. 1863, p. 247; Icon. Gén. livr. 13, 1865, pl. 5.

*Callopeltis quadrilineatus*, Schreib. Herp. Europ. 1875, p. 277.

Snout obtuse, rather broad; rostral broader than high, scarcely, if at all, visible from above; internasals slightly broader than long or nearly as broad as long, smaller than the præfrontals, more or less quadrangular; præfrontals considerably longer than the internasals; frontal shield-shaped, as long as the median suture of the parietals, equal to the distance between its anterior border and the tip of the snout, nearly twice as broad as the supraocular; its anterior breadth equal to two-thirds of its length; parietals moderately long, equal to the length of the frontal, and one-half the length of the præfrontal; loreal nearly twice as long as high; one præocular, broadly excluded from the frontal; two postoculars; 8 upper labials, the fourth and fifth entering the orbit; temporals 1, 1+2, 2+2, or 2+3; anterior chin-shields nearly twice as large as the posterior pair, in contact with five sublabials, posterior pair separated by scales. 25 to 27 rows of smooth scales across the body; ventrals rounded or slightly angulate at their sides, 220-260; A. 1/1; S.C. 68-89.

Uniform greyish ashy, with a mesial dorsal whitish line or narrow band margined with black, with a broader brownish band external to it on each side also margined externally with black; the sides with black reticulations. Under surface whitish,

<sup>1</sup> Cat. Snakes B. M. ii. 1894, p. 24.

more or less spotted with blackish. A black semilunar band, convex anteriorly, passing across the upper surface of the head from the anterior margin of one supra-ocular to the other, anterior to the frontal, but involving the hinder half of the præfrontals; a narrow black line between the suture of the supraocular and parietal and passing backwards to the angle of the mouth, and a narrow black line along the mesial suture of the parietals and bifurcating posteriorly to join the lower black marginal line of each lateral brown body-band; labials margined with blackish.

In the variety to which the term *quadrilineatus* has been given there are four longitudinal bands, and in the typical form *leopardinus* there is a series of brown or reddish spots margined with black, more or less transverse in their arrangement and alternating with smaller black spots on the sides. The under surface in these colour varieties is sometimes almost wholly black.

It attains, according to Mr. Boulenger, to 900 millim. in length, of which the tail is 160 millim.

It is distributed from the Adriatic (Trieste) to the Euxine (Crimea), Southern Italy, Malta, Greece and its islands, Chios, Asia Minor, and Syria.

Boettger has recorded it from Beirût, but its presence in Egypt has yet to be confirmed. While it is true that Linnæus ascribed the specimen now in the Stockholm Museum to Egypt, it is noteworthy that it was not included by Hasselquist in his account of his discoveries in that country, and it must therefore be supposed that it was afterwards found by Linnæus among the collections of his late pupil, along with two other species—*C. jugularis* and *C. tyria*, also referred to Egypt. The last-mentioned type has been lost. This species, *C. situla*, however, has never been met with in Egypt since the days of Linnæus, and, in conjunction with this, the fact that Hasselquist travelled through part of Palestine and also of Asia Minor cannot be lost sight of in estimating the reliance to be placed on the accuracy of the locality ascribed to it and to *Z. jugularis*.

This species was first described in the 10th ed. of the Syst. Nat., and it appeared in the second part of the Mus. Adolph. Frid.<sup>1</sup>, and again in the 12th ed. of the former

<sup>1</sup> Linnæus, in the first part of the Catalogue of Adolphus Frederick's Museum (1754), described a snake under the name of *Coluber corallinus* \*. In the margin of the text the sex is given as that of a male, the ventrals as 193, and the subcaudals as 82, and, what is rather a novelty in Linnæus's description of snakes, the number of scales across the body is stated to have been 17; and the scales are said to have been smooth. This snake was said to have been obtained in Egypt. A reference to Seba's work is quoted as follows:—"Serpens corallina amboinensis, Seba, Thes. 2, p. 18, t. 17. fig. 1." It is further mentioned that it was "*Serpens ipississimus* SEBÆ, delineatus in thesauro, qui deglutit ac ingurgitat Lacertam cœruleam, &c." This serpent reappears in the 10th and in the 12th edition of the Syst. Nat., but in both of these works Asia is substituted for Egypt. Mr. Boulenger, in the Appendix to the third volume of the 'Cat. of Snakes' †, identified it with *Liophis triscalis*, Linn., of South America, and a drawing which Mr. Smit made of the specimen at Stockholm, that came from the Museum of Drottningholm, fully verifies the correctness of his identification.

\* *Op. cit.* p. 33.

† P. 634.

work. The type still exists in the Stockholm Museum. The bottle in which it is preserved has the original Linnean printed label *Coluber situla* attached to it, and in Quensel's MS. catalogue of the Museum the specimen is stated to be the type of the species, to have come from Egypt, and to have been one of the specimens from the Drottningholm Museum. Linnæus, in his description, records that the specimen had 235 ventrals and 48 caudals. Mr. P. J. Smit counted the shields of the type at my request, and in his notes they are put down as ventrals 235, caudals 48; he mentions that the anal is divided. It would thus appear to be what it claims to be, viz. the type of *C. situla*. It has 27 smooth scales across the body from side to side, is 870 millim. long, but the tail is imperfect.

I have to record my obligations to Prof. Smitt for having permitted me to figure in this work the type specimen of this Linnean species that has lain now nearly a century in spirit, practically unknown to herpetologists. When I received the drawings of *C. situla*, Linn., I showed them to Mr. Boulenger, who at once recognized them as representing *Coluber leopardinus*. After a careful comparison of the drawings with specimens of that species, I have fully satisfied myself of the identity of the two. From Plate XXXVII. A. fig. 2 it will be seen that Hasselquist's specimen belongs to the striped variety, *trilineata*. Linnæus says, "griseus vitta longitudinali utrinque linea nigra marginata."<sup>1</sup>

<sup>1</sup> In his systematic enumeration of the *Coronellidæ* in the Milan Museum, Jan\* has mentioned a specimen of *Coronella austriaca* said to have come from Cairo, which he regarded as a variety and named *ægyptiaca*. Strauch†, in his account of the snakes of Russia, repeated Jan's statement that *C. austriaca* occurred in Egypt, but adduced no additional evidence in support of this improbability. It is noteworthy, however, that no allusion was made by Jan to the variety *ægyptiaca* in the Icon. Gen. Oph.

\* Arch. Zool. Anat. e Fisiol. ii. 1863, fasc. ii. p. 238; Elenco Sist. 1863, p. 48.

† Mém. Ac. St. Pétersb. (vii.) xxi. no. 4, 1873, p. 43.



## OLIGODON.

*Oligodon*, Boie, Isis, 1827, p. 519.

Body cylindrical, moderately elongate; tail short or somewhat long; head ovate, not distinct from the neck; rostral large; nostril between two plates, either in a single or in a partially divided nasal; eye small, pupil round. Dorsal scales rhomboidal, smooth, in 15 to 17 rows. Maxillary teeth 6 or 8, enlarged from before backwards, the terminal long and strong; no pterygoid teeth; palatines either edentulous or with two or three teeth; mandibular teeth slightly longer anteriorly than posteriorly.

## OLIGODON MELANOCEPHALUS, Jan. (Plate XXXIV. fig. 2.)

*Oligodon melanocephalus*, Blgr. Cat. Snakes B. M. ii. 1894, p. 246.

Head small; snout somewhat pointed; rostral projected backwards between the internasals, portion visible from above equalling the distance between the rostral and the frontal or somewhat longer; internasals smaller than the præfrontals, the suture between them as long as that between the latter; frontal shield-shaped, slightly longer than its anterior breadth, equalling in length the interval between its anterior border and the tip of the snout; supraocular considerably narrower than the frontal; parietals a little longer than the frontal, rounded posteriorly; nasal single, oblong; loreal square, present or absent; one præocular, broadly excluded from the frontal; one postocular; temporals 1+1 or 1+2; six or seven upper labials, the third and fourth entering the orbit; anterior pair of chin-shields in contact with three or four labials; posterior pair almost scale-like. 15 rows of scales. Ventrals 181-229; anal 1/1; subcaudals 53-68.

Upper surface reddish olive, lower surface yellowish white; upper surface of head, rostral shield, nape and sides of the neck bluish black.

Dr. Günther gives the total length of the specimen which served him as the type of *Rhynchocalamus melanocephalus*, here figured, as being nearly 460 millim., of which the tail formed 75 millim.

Only a single example of this species has ever been recorded from Africa. It was found at Cairo, and is preserved in the Museum at Basel. It is also present in the Sinaitic Peninsula, Palestine, and Syria.

RHACHIODONTINÆ<sup>1</sup>.

## DASYPELTIS.

*Dasyveltis*, Wagler, Syst. Amph. 1830, p. 178.

Body elongate, rounded, or slightly compressed; head small, short, scarcely distinct from the neck; head-scales regular; frontals and parietals subequal; no loreal; nasal semidivided; no mental groove; eye moderate, pupil vertical. Scales with apical pits, strongly keeled, lanceolate, in twenty-three to twenty-seven rows, three or four of the outer rows arranged obliquely and with serrated keels. Maxillary and mandibular teeth small, 3 to 7 in number.

## DASYPELTIS SCABRA, Linn. (Plate XXXIV. fig 3, and Plate XXXIX.)

*Dasyveltis scabra*, Blgr. Cat. Snakes B. M. ii. 1894, p. 354, and iii. 1896, p. 648; Ann. Mus. Civ. Genova, (2) xvi. (xxxvi.) 1896, p. 553; id. op. cit. (2) xvii. (xxxvii.) 1896-97, pp. 20 & 279; Ann. & Mag. N. H. (6) xix. 1897, p. 279; Proc. Zool. Soc. 1897, p. 801; Bocage, Herpét. d'Angola et du Congo, 1895, p. 107; Günther, Proc. Zool. Soc. 1894, p. 87; Werner, Verh. zool.-bot. Ges. Wien, xlv. (1895) p. 193; Anderson, Herpet. Arabia & Egypt, 1896, p. 114; Bocage, Journ. Sc. Lisb. (2) iv. 1896, no. 14, p. 78; Tornier, Kriechth. Deutsch-Ost-Afr. 1897, p. 78; Werner, Verh. zool.-bot. Ges. Wien, xlvii. 1897, p. 399.

*Dasyveltis scaber*, Gasco, Viagg. in Egitto, pt. ii. 1876, p. 119.

*Dasyveltis fasciata*, Matschie, Zool. Jahrb. Syst. v. 1890, p. 617.

1 ♀. Fayum. A. R. Birdwood, Esq.

Snout short, broadly rounded anteriorly; rostral broader than deep, slightly visible above; internasals somewhat shorter than the præfrontals, sometimes coalescing and broadly in contact with rostral; præfrontals prolonged down on to the side of the head, the sutures with the frontal posteriorly divergent; frontal somewhat variable, longer than broad, shield-shaped, about twice as long as the distance between its anterior border and the end of the snout, traversed by a well-defined, broad, mesial furrow; supraocular elongate, rather narrow, its greatest breadth less than half its length, broadly in contact with the præfrontal; parietals as long as or longer than the frontal, slightly divergent posteriorly or rounded; one, seldom two præoculars; two postoculars, rarely one or three; temporals 3+3 or 2+3 or 3+4, occasionally 1+3, the lowest anterior temporal occasionally enlarged; seven or eight upper labials, sometimes six, the

<sup>1</sup> Blgr. Cat. Snakes B. M. ii. 1894, p. 353:—"Only a few teeth, on the posterior part of the maxillary and dentary bones and on the palatines. Some of the anterior thoracic vertebrae with the hypapophysis much developed, directed forwards, and capped with enamel."



DASYPHELTIS SCABRA.  
♀ THE FAYUM.



third and fourth, or second and third, entering the orbit; anterior chin-shields large, in contact with three lower labials; posterior chin-shields about half the size of the anterior, in contact with two labials. 23 to 27 scales round the body. 185-263 ventrals; anal 1; subcaudals 41-94.

Colour above olive, greyish, or dark brown, occasionally uniformly so, or with a dorsal series of large, dark brown, more or less elongately oval or round spots, some more or less slightly bifurcate posteriorly; a lateral series of smaller brown spots along the side, alternating with the former, and every third or fourth pair of ventrals with a black spot on the angles. Head obscurely marbled with dark brown and greyish, with a  $\Lambda$ -shaped mark from the parietals backwards obliquely to the angle of the mouth, and a more or less similarly shaped but much broader mark on the nape, sometimes broken up into a large dorsal spot, with a smaller spot obliquely behind it. Upper labials with dusky sutures. Underparts yellowish, immaculate, or spotted with brown or black.

The coloration of the Egyptian snake is practically identical with that of the type described by Linnæus. There are, however, certain variations, all of which have been indicated by Mr. Boulenger. In some the dorsal spots become more or less confluent as a zigzag vertebral band, and a black stripe runs along the upper surface of the tail and the belly is spotted with black; but the most striking variety is that in which the dorsal and lateral bands unite to form cross-bands and the belly is unspotted. There is, however, a still further marked variation in which all the spots and markings disappear and the snake is a uniform brown above. Another variety is intermediate between the typical form and the latter, as the markings tend to become effaced. In Abyssinia snakes conforming to the Egyptian specimen are found, but with the ventrals edged with black.

It attains to a length of 760 millim., of which the tail measures 105 millim.

Gasco, who was the first to record the presence of this species in Egypt, states that he obtained 8 examples in Middle Egypt, but in what part of it he does not mention. After much correspondence with those in Egypt who have been assisting me in my researches, at last, through the efforts of Mr. A. R. Birdwood, after I had almost given up all hope of finding this species, I received the specimen herein recorded alive, and am thus enabled to give a figure of it from life. It was obtained in the Fayum.

This species has a wide distribution over Africa, from Sierra Leone to Somaliland, southwards to the Cape of Good Hope, and northwards along the valley of the Nile to within about 140 miles of the Mediterranean.

Possibly one reason why this species has been overlooked, until 1876, may be due to the circumstance that it may have been avoided on account of its extremely close resemblance to *Echis carinatus*. In coloration they are almost identical. The similarity of the two extends even to the character of their scales, in this respect, that in the poisonous *Echis*, as in this harmless egg-eater, some of the outer rows of the dorsal



scales are modified to produce a noise when the folds of the body are rubbed against one another, as occurs also in *Cerastes*. The simulation by *Dasypeltis* of these characters of the poisonous snake might be said to be its protection, but, on the other hand, the resemblance of *Echis* to *Dasypeltis* might likewise be to its advantage!

As is well known, it lives exclusively on the eggs of birds. On Plate XXXIX. it is represented in the act of swallowing a pigeon's egg, but fowls' eggs are even within its capacity. Dr. Andrew Smith<sup>1</sup>, writing in 1842, says: "The paucity and smallness of the teeth in the mouth are favourable to the passage of the egg, and permit of its progress without injury, whereas were they otherwise, many eggs, which have very thin shells, would be broken before they entered the gullet, and the animal in consequence would be deprived of its natural food when within its reach." After the egg has passed back behind the head into the gullet its further progress is arrested and the snake makes violent efforts to crush it by contracting its neck. The modified hypapophyses of the anterior thoracic vertebræ protruding into this part of the œsophageal tract and capped with enamel-like teeth now perform their function, and, by the egg being forced against them by muscular contraction of the neck, fracture the shell, the contents of which pass backwards to the stomach, while the crushed egg-shell is prevented from doing so by the gullet teeth. After all the fluid contents have been squeezed out of the broken-up shell the latter is ejected from the mouth as a pellet about 15 minutes after the egg has been swallowed.

I have not been able to ascertain whether the natives have any name for this snake. The specimen sent alive by Mr. Birdwood simply bore the name "Snake of the Fayum."

*Measurements &c. of D. scabra, Linn. (in millim.).*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Sub-oculars.	Pre-oculars.	Relation of pre-oculars to frontal.	Post-oculars.	Temporals.	Loreal.	Locality.
♀	602	95	230	1	49	24	8	4 & 5	0	1	B. Ex.	2	3+3	0	Fayum.

It seems remarkable that a snake of this kind, so specialized as regards its food-supply, should have been unknown to the ancient Egyptians. There is no evidence, so far as I have been able to discover, that they were acquainted with it, unless the figure, said to occur on the monuments, of a hawk-headed serpent with an egg in its mouth may have been derived from some knowledge of it.

<sup>1</sup> Ill. Zool. S. Afr. pl. lxxiii.

## Series B. OPISTHOGLYPHA.

## DIPSADOMORPHINÆ.

## TARBOPHIS.

*Tarbophis*, Fleischmann, Dalm. Nov. Serp. Gen. 1831, p. 17.

Body elongate, cylindrical, slightly compressed; head distinct from the neck; tail moderately long, cylindrical, pointed; eye rather large, pupil vertically elliptic; nostril in an entire, semidivided or divided nasal; loreal present. Scales smooth, with apical pits, in 19–23 rows; ventrals round; anal entire or divided. Maxillary teeth in two groups: an anterior, 10–12 in number, decreasing in length from before backwards, and a posterior group of two grooved fangs separated from the former by an interspace and placed far back in the mouth; anterior mandibular teeth long, posterior much shorter.

Milne-Edwards<sup>1</sup>, in 1860, pointed out that in this series of serpents there exists a gland analogous to the poison-gland of the Proteroglypha and sometimes confounded with the series of superior labial glands which some authors call the maxillary gland; and Mr. G. S. West<sup>2</sup> has recently examined this point in a number of genera.

The serpents from Southern Syria referred to the following species had been regarded as examples of *T. fallax*, Fleischm., until Mr. Boulenger showed ('Cat. Snakes,' iii. p. 48) that they constitute a distinct species, of which he believes we find figures on Suppl. Rept. pl. iv. (1813) figs. 21–23 of the 'Descr. de l'Égypte.' He accordingly named it *T. savignyi*. As these figures are the only records extant of its supposed occurrence in Egypt, a portion of fig. 21 with figs. 22 and 23 are here reproduced, along with Mr. Boulenger's description of the species drawn up from Southern Syrian specimens, for much the same reasons as those mentioned under *Zamenis dahlui*.

<sup>1</sup> Leçons Phys. et Comp. Anat. vi. p. 225.

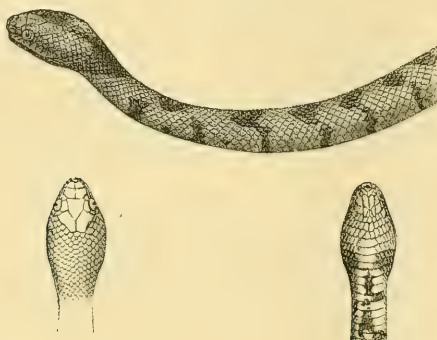
<sup>2</sup> Proc. Zool. Soc. 1895, pp. 812–826, pls. xlv. & xlv.

## TARBOPHIS SAVIGNYI, Blgr. (Fig. 11 text.)

*Couleuvre*, Savigny, Descr. de l'Égypte, Hist. Nat. i. ? 1829, Suppl. Rept. pl. iv. (1813) figs. 21-23.  
*Tarbophis savignyi*, Blgr. Cat. Snakes B. M. iii. 1896, p. 48.

"Very closely allied to *T. fallax*, but snout shorter and broader; internasals broader than long; frontal not more than once and one third as long as broad; nasal entire or semidivided; loreal once and a half to twice and a half as long as deep, usually entering the eye; posterior chin-shields narrowly separated from each other in front. Scales in 19 rows. Ventrals 174-190; anal divided; subcaudals 45-57. Yellowish

Fig. 11.

*Tarbophis savignyi*, Blgr.

Reproduced from Plate iv. (1813) figs. 21, 22, and 23 of Reptiles (Supplement), Descr. de l'Égypte.

above, with a dorsal series of 23 to 28 dark brown or black spots on the body, these spots sometimes confluent with a lateral series of spots or vertical bars which usually alternate with the dorsal series; the first blotch largest, covering the nape and descending to the sides of the neck, which it may entirely encircle; head greyish above, dotted with black and with a few small black spots; labials dark-edged; belly black, or much spotted or marbled with dark brown or black.

"Total length 465 millim.; tail 65.

"Southern Syria, Lower Egypt."

## TARBOPHIS OBTUSUS, Reuss. (Plate XXXIV. fig. 4.)

- Couleuvre*, Savigny, Descr. de l'Égypte, Hist. Nat. i. ? 1829, Suppl. pl. v. (1812) figs. 11-13.  
*Coluber obtusus*, Reuss, Mus. Senck. i. 1834, p. 137.  
*Dipsas aegyptiacus*, Schlegel, Phys. Serp. 1837, ii. p. 274; Abbild. 1844, pl. xlv. figs. 19 & 20.  
*Dipsas (Telescopus) aegyptiaca*, Rüppell, Mus. Senck. iii. 1845, p. 311.  
*Telescopus obtusus*, Dum. & Bibr. vii. 1854, p. 1056; Peters, Mon. Berl. Ak. 1862, p. 274;  
 Gasco, Viagg. in Egitto, pt. ii. 1876, p. 120; F. Müller, Verh. nat. Ges. Basel, vii. 1882,  
 p. 152; Mocquard, Mém. Cent. Soc. Philom. 1888, p. 133\*.  
*Dipsas (Telescopus) obtusus*, Boettger, Zool. Anz. 1893, no. 416, p. 119.  
*Dipsas obtusa*, Werner, Verh. zool.-bot. Ges. Wien, xlv. 1895, p. 193; Tornier, Kriechth. Deutsch-  
 Ost-Afr. 1897, p. 84.  
*Tarbophis obtusus*, Blgr. Ann. Mus. Civ. Genova, (2) xv. (xxxv.) 1895, p. 15; Anderson, Proc. Zool.  
 Soc. 1895, p. 658; Blgr. Ann. Mus. Civ. Genova, (2) xvi. (xxxvi.) 1896, p. 553; op. cit. (2)  
 xvii. (xxxvii.) 1896-97, p. 20 & p. 279; Cat. Snakes B. M. iii. 1896, p. 52.  
*Tarbophis dhara*, Anderson, Herpet. Arabia & Egypt, 1896, p. 108.
- 1 ♀. Beltin. Surgeon Lieutenant-Colonel Sir J. G. Rogers, D.S.O., K.C.M.G.  
 1 ♀. Mahallet el Kebir. George Kent, Esq.  
 4 adol. and juv. Margin of desert, Gizch.  
 1 ♀ and 1 juv. Tel el Amarna. Professor Flinders Petrie, D.C.L.  
 1 juv. Tel el Amarna.  
 1 juv. Assuan. Brigadier-General D. F. Lewis.

Head very distinct from the neck; snout short, broad, and rounded. Rostral broader than high, only slightly visible from above; internasals somewhat broader than long, equalling about two-thirds of the length of the præfrontals; præfrontals little more than one-half the length of the frontal; frontal about one-third longer than the distance between its anterior border and the end of the snout, its extreme breadth falling short of its length by about one-fourth, sides more or less concave, generally more or less in contact with the præocular, but sometimes excluded from it; parietals usually longer than the frontal, longer than broad, their breadth equalling about two-thirds of their length; occasionally a small shield behind them; nasal divided; loreal about twice as long as deep; one præocular; two postoculars; temporals 2+2, 2+3, and 3+3, and rarely and asymmetrically 1+2, 2+4, or 3+4. Generally 10 upper labials, not unfrequently 9, rarely 11; usually the 4th, 5th, and 6th entering the orbit, occasionally the 3rd, 4th, and 5th, and rarely the 4th and 5th, and the 5th, 6th, and 7th. Chin-shields small; anterior pair much the larger, in contact with three to five labials; posterior pair scale-like, widely apart. 21 to 23 scales round the body, rarely 19. 203-274 ventrals; anal divided or single; 66-81 subcaudals.

General colour uniform purplish brown or greyish brown, or marked more or less obscurely with numerous narrow, cross, brown markings, becoming indistinct

posteriorly, and separated from each other by narrow pale interspaces or lines; upper labials sometimes slightly orange-yellow with dark margins; underparts pure white.

The largest adult male from Egypt is 1105 millim. long, of which the tail forms 170 millim.

It is distributed over the Nile valley from near the Mediterranean to Sennaar, and is also present in Somaliland and Eritrea.

This species is generally found on the margin of the desert. It frequents houses.

I removed an entire *Motacilla alba*, Linn., from the stomach of one of these snakes.

In Egypt it is called ابو عين = *abu uyun* = the father of eyes; and it was once known in scientific literature as "*Telescopus*," owing to the prominence of its eyes.

Forskål in his journey through El Yemen, the most southern province of Arabia on the littoral of the Red Sea, obtained a snake he described as *C. dhara*, which undoubtedly belongs to this genus. Unfortunately he gave no information regarding the condition of its anal, nor did he mention the number of scales round its body. Reuss, in 1834, described the present species, which is evidently closely allied to *C. dhara*, Forskål, from a specimen obtained in Egypt by Rüppell. I have examined the type in the Frankfurt Museum. It has 268 ventrals, a divided anal, 74 subcaudals, and 23 rows of scales round its body. In 1895, I described from Eastern Arabia another species, *T. guentheri*, characterized by 21 (or 19, E. Africa) rows of scales across the body, 205-274 ventrals, an undivided anal, and 69-75 subcaudals, or 110 (Usambara). Since then I have received from Medina a specimen with all the characters of *Tarbophis obtusus*, i. e. 23 rows of scales and a divided anal. As the two species are thus present in Arabia, it is impossible to say which corresponds to *C. dhara*, Forskål. It is worthy of note that the snake in the Stuttgart Museum figured by Jan<sup>1</sup> as *Telescopus obtusus* has an undivided anal and came from Egypt. Snakes corresponding to those from Eastern Arabia (i. e. *T. guentheri*) are found at Jerusalem<sup>2</sup>, and at Ngatana, E. Africa<sup>3</sup>.

In the following table I have registered a few details in the arrangement of the head-shields of all the species of the genus, the number of the ventrals and subcaudals, the character of their anals, and the number of scales round their bodies. It will be seen wherein *T. obtusus* and *T. guentheri* differ from one another.

If the specimen from Somaliland with only 213 ventrals has been correctly determined, the variation in the number of the ventrals is very great, as one Egyptian snake has as many as 272 shields. The same remark is also even more called for in the case of *T. guentheri*, as a representative of that species at Ngatana, British East Africa, has only 205 ventrals, whereas at Maskat, in Arabia, the ventrals rise to 274, thus giving a variation of 69 shields. It would seem that its north-eastward range, from Ngatana to Maskat, is characterized by a gradual increase in the number of the ventrals.

<sup>1</sup> Icon. Gén. livr. 38, 1871, pl. i. fig. 4.

<sup>2</sup> Werner, Verh. zool.-bot. Ges. Wien, 1896, xlv. p. 361.

<sup>3</sup> Blgr. Cat. Snakes B. M. iii. 1896, p. 52.



*Measurements (in millim.) of 51 specimens of Tarbophis and details of variation in the different species.*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering eye.	No. of dark dorsal spots or bars.	Preoculars.	Relation of preoculars to frontal.	Postoculars.	Temporals.	Nasals.	Locality.
<i>Loreal entering the orbital margin.</i>															
<i>T. savignyi, Boulenger.</i>															
♀	475	67	174	1/1	51	19	8	3, 4, 5	23	1	B. C.	2	2+3	1	Jerusalem.
Juv.	221	35	178	1/1	55	19	8	3, 4, 5	30	1	B. C.	2	2+4	1	"
♂	460	66?	187	1/1	..	19	8	3, 4, 5	28	1	B. C.	2	2+2 3+3	1	Mount Tabor.
Juv.	253	35	190	1/1	53	19	8	3, 4, 5	25	1	B. C.	2	2+4	1	Lebanon.
<i>T. fallax, Fleischmann.</i>															
♂	565	91	186	1/1	53	19	7	3, 4, 5	44	1	C.	2	L. 3+4 R. 3+3	1	Beirut.
♂	770	112	194	1/1	..	19	8	3, 4, 5	53	1	C.	2	L. 2+4 R. 2+3	1	Dalmatia.
♀	545	77	199	1/1	48	19	8	3, 4, 5	45	1	B. C.	2	L. 2+3 R. 2+4	1	"
Juv.	263	37	199	1/1	52	19	8	3, 4, 5	..	1	B. C.	2	L. 2+3 R. 2+4	1	"
♀	500	..	199	1/1	..	21	8	3, 4, 5	40	1	B. C.	2	L. 2+5 R. 2+4	1	Cyprus.
♂	860	120	204	1/1	50	19	8	3, 4, 5	47	1	B. C.	2	2+2	1	Dalmatia.
♂	605	93	204	1/1	55	19	L. 9 R. 8	3, 4, 5	52	1	B. C.	2	2+2	1	"
♀	585	85	204	1/1	51	19	8	3, 4, 5	50	1	B. C.	2	L. 2+3 R. 2+4	1	"
♀	615	88	206	1/1	52	19	8	3, 4, 5	44	1	B. C.	2	2+4	1	Zara.
♂	600	94	206	1/1	56	19	8	3, 4, 5	59	1	L. B. Ex. R. C.	2	2+3	1	Dalmatia.
♀	640	95	207	1/1	54	19	8	3, 4, 5	48	1	B. C.	2	L. 2+4 R. 3+4	1	"
♀	635	98	208	1/1	55	19	8	3, 4, 5	43	1	B. C.	2	2+3	1	Cerigo Is.
♀	615	105	208	1/1	66	21	8	3, 4, 5	45	1	B. C.	2	L. 2+5 R. 2+3	1	Cyprus.
♀	402	70	211	1/1	73	19	L. 9 R. 8	L. 4, 5, 6 R. 3, 4, 5	55 46	1	B. C.	2	2+4	1	Xanthus.
<i>T. iberus, Eichwald.</i>															
♂	650	100	213	1	61	19	..	..	35	..	..	..	..	semi-divided	Evlakh, Transcaucasia.
<i>T. rhinopoma, Blanford.</i>															
♂	1018	160	268	1	77	23	10	4, 5, 6	65 to 85	1	B. C.	2	2+5 2+3	1	Karman, Persia.
Juv.	491	75	280	1	82	23	9	4, 5, 6	85	1	B. C.	2	2+5 3+4	1	Sind.

*Measurements &c. (continued).*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering eye.	No. of dark dorsal spots or bars.	Pre-oculars.	Relation of pre-oculars to frontal.	Post-oculars.	Temporals.	Nasals.	Locality.
<i>Loreal excluded from the orbital margin.</i>															
<i>T. variegatus, Reinhardt.</i>															
♂	615	100	218	1/1	64	19	7	3, 4 4, 5	26 to 30	1	B. Ex.	3	2+3	2	West Africa.
♀	570	78	226	1/1	62	19	9 8	4, 5	30	1	B. Ex.	2	2+2 2+3	2	" "
<i>T. semiannulatus, Smith.</i>															
♂	656	..	224	1/1	..	19	8	3, 4, 5	24	1	B. Ex.	2	2+2	2	Loanda, W. Africa.
♀	835	122	224	1/1	64	19	8	3, 4, 5		1	B. Ex.	2	2+2 1+2	2	Nyassa.
♀	675	113	224	1/1	73	19	8	3, 4, 5	to	1	B. Ex.	2	2+3	2	Mombassa.
♀	415	57	225	1/1	58	19	8	3, 4, 5		1	B. Ex.	2	2+2	2	Nyassa.
♀	745	..	228	1/1	..	19	8	3, 4, 5		1	B. Ex.	2	2+3	2	Tanganyika.
♀	726	117	230	1/1	63	19	8	3, 4, 5	34	1	B. Ex.	2	2+3	2	Coast of Zanzibar.
<i>T. obtusus, Reuss.</i>															
♂	492	95	213	1/1	80	22	L. 9 R. 8	L. 4, 6 R. 3, 4		1	B. C.	2	2+3	2	Somaliland.
♀	963	140	246	1/1	72	23	10	4, 5, 6		1	?	2	R. 2+4 L. 2+3	2	? Egypt.
♂	845	123	253	1/1	?60	23	..	..		..	..	..	..	..	Medina.
Juv.	305	49	257	1/1	79	23	10	4, 5, 6		1	0	2	2+3	2	Gizeh.
Juv.	335	46	258	1/1	69	23	10	4, 5, 6		1	R. C. L. 0	2	2+3	2	"
Juv.	390	56	258	1/1	70	23	10	4, 5, 6		1	B. C.	2	2+3 2+4	2	Telet Amarna.
♀	840	125	260	1/1	70	23	10	4, 5, 6		1	B. C.	2	2+3	2	Mahallet el Kebir.
Hgr.	505	80	262	1/1	77	23	10	4, 5, 6		1	0	2	2+3	2	Gizeh.
♀	840	130	263	1/1	75	23	10	5, 6, 7 4, 5, 6		1	B. C.	2	2+4	2	Beltim.
Juv.	435	69	263	1/1	81	23	10	4, 5, 6		1	C.	2	2+3	2	Assuan.
Juv.	343	51	264	1/1	66	23	10	4, 5, 6		1	B. C.	2	3+3	2	Telet Amarna.
Juv.	396	55	266	1/1	67	23	10	4, 5, 6		1	C.	2	2+3	2	Gizeh.
♂	1105	170	271	1/1	75	23	10	4, 5, 6		1	B. C.	2	2+3	2	Egypt.
♀	1103	161	272	1/1	72	23	10	4, 5, 6		1	C.	2	R. 3+4 L. 3+3	2	Telet Amarna.

Ill-defined, frequently absent on the body posteriorly or the entire upper surface of the snake uniformly colored.

*Measurements &c. (continued).*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering eye.	No. of dark dorsal spots or bars.	Pre-oculars.	Relation of pre-oculars to frontal.	Post-oculars.	Temporals.	Nasals.	Locality.
<i>T. guentheri, Anderson.</i>															
♂	645	120	205	1	72	19	L. 10 R. 9.	3, 4, 5	III defined, frequently absent on the body posteriorly, or the entire snake uniformly coloured.	1	B. Ex.	2	2+2	2	Ngatana.
			223	1	110	19	..	..		..	..	..	..	..	Usambara (Werner).
♂	987	160	235	1	66	21	9	3, 4, 5		1	B. Ex.	2	2+3	2	Lahej, Aden.
♀	955	147	236	1	69	21	9	3, 4, 5		1	B. Ex.	2	2+2	1	Hadramut.
♀	602	101	238	1	72	21	9	L. 3, 4, 5 R. 4, 5		1	R. C. L. 0	2	2+2	1	..
♀	851	155	240	1	71	21	L. 9 R. 10	L. 3, 4, 5 R. 4, 5, 6		1	B. Ex.	2	2+3	1	Shaikh Othman.
♂	695	110	264	1	69	21	9	L. 3, 4, 5 R. 4, 5		1	B. Ex.	2	2+2	1	Maskat.
♀	850	127	274	1	67	21	9	3, 4, 5		1	B. Ex.	2	2+2	1	..

*Analysis of that portion of the foregoing Table which refers to T. obtusus, Reuss.*

Largest male	1105 millim.	Largest female	1103 millim.
Highest number of ventrals	272 ♀.	Tel el Amarna.	
" " subcaudals	81 juv.	Assuan.	
Lowest number of ventrals	213 ♂.	Somaliland.	
" " subcaudals	66 juv.	Tel el Amarna.	
Range of ventrals	213-272 = 59.		
" caudals	66-81 = 15.		
Lowest number of scales	19.	Ngatana, E. Africa.	
Highest " "	23.	Egypt and N.W. Arabia.	
Range of scales	4.		

Another genus of this subfamily is represented at Sennaar by *Leptodira hotambæia*, Laur., a species present in Senegambia, Eritrea, and East Africa, and distributed southwards to the Cape of Good Hope.

## CÆLOPELTIS.

*Cælopeltis*, Wagler, Syst. Amph. 1830, p. 189.

Head distinct from the neck; snout rather acute; canthus rostralis present; supra-ocular strong, projecting beyond the eye; loreal more or less quadrate; frontal long and narrow; pupil round; nostril in single or divided shield; scales smooth, with apical pits, in 17 or 19<sup>1</sup> rows, longitudinal mesial line more or less concave; ventrals rounded; subcaudals double; 10 to 17 subequal maxillary teeth, separated posteriorly from one or two terminal long grooved fangs; six or seven anterior maxillary teeth, much enlarged, but decreasing in length about the fifth, and followed by about 17 small teeth, diminishing in size from before backwards.

*C. monspessulana* has been shown by Peracca and Deregibus<sup>2</sup> to be furnished with a well-developed poison-gland that lies behind the eye, corresponding in position to the fifth, sixth, and seventh upper labials, and placed in direct relation with the very large grooved fang situated below the posterior border of the eye. Their experiments proved that the bite of *Cælopeltis* is fatal to birds, lizards, and frogs, but that the grooved tooth must remain in the wound for one or two minutes to produce such a result. Jourdan<sup>3</sup>, who has experimented with small mammals, states that the venom of *Cælopeltis* has an activity comparable to that of the viper. He says that if due precautions are taken that a limb be bitten by the hinder grooved tooth the victims died very rapidly.

## CÆLOPELTIS MONSPESSULANA, Hermann. (Plate XXXVII. fig. 4.)

? *Coluber hannasch asuæd*, Forskål, Descr. Anim. 1775, pp. viii et 15.

*Coluber monspessulanus*, Hermann, Obs. Zool. i. 1804, p. 283; Dugès, Ann. Sc. Nat. (2) iii. 1835, p. 137, pl. v. B, figs. 1-6; de Betta, Cat. Syst., sect. i. Rept. Europ. 1853, p. 20.

*Couleuvre*, Savigny, Descr. de l'Égypte, Hist. Nat., Suppl. pl. Rept. pl. v. (1812) figs. 21-22 & 31-32.

*Coluber (Natrix) monspessulanus*, Merr. Syst. Amph. 1820, p. 130.

*Natrix lacertina*, Wagler, Spix, Nov. Sp. Serp. Brasil. 1824, p. 18, pl. 5.

*Coluber neumayeri*, Fitz. Neue Class. Rept. 1826, p. 57.

*Coluber rupestris*, Risso, Hist. Nat. Eur. Mérid. iii. 1826, p. 91.

*Malpolon lacertinus*, Fitz. Neue Class. Rept. 1826, p. 59.

*Coluber æsculapii*, Dugès, Ann. Sc. Nat. xii. 1827, p. 394, pl. xlvii. fig. 17; Gervais, op. cit. (2) vi. 1836, p. 312.

<sup>1</sup> Boettger records 20.

<sup>2</sup> Giorn. R. Ac. Med. Torino, 6 June, 1883; Biol. Centralb. iv. 1885; Arch. Ital. Biol. v. 1885.

<sup>3</sup> Comptes Rendus Ac. Sc. cxviii. 1894.

*La Couleuvre maillée*, Is. Geoffr. St.-Hilaire, Descr. de l'Égypte, Hist. Nat. i. 1827, p. 147 (not pl. vii, fig. 6).

*Coluber insignitus*, Is. Geoffr. St.-Hilaire, Descr. de l'Égypte, Hist. Nat. i. 1827, p. 151.

*Psammophis lacertina*, Boie, Isis, 1827, p. 526; Schlegel, Phys. Serp. ii. 1837, p. 203, pl. viii. figs. 1-3; Wagner's Reisen in Alg. iii. 1841, p. 131.

*Cælopettis lacertina*, Wagler, Syst. Amph. 1830, p. 189; Eichw. Faun. Casp.-Cauc. 1841, p. 122; Nouv. Mém. Soc. Nat. Mosc. vii. 1842, p. 154; Fitz. Syst. Rept. 1843, p. 26; Guichenot, Explor. Sc. Alg., Rept. 1850, p. 23; Günther, Cat. Snakes B. M. 1858, p. 138; Proc. Zool. Soc. 1879, p. 741; Strauch, Mém. Ac. St. Pétersb. (vii.) iv. no. 7, 1862, p. 67; op. cit. (vii.) xxi. no. 4, 1873, p. 179; Schreib. Herp. Europ. 1875, p. 221, fig.; Blanford, East. Persia, Zool. ii. 1876, p. 424; Gasco, Viagg. in Egitto, pt. ii. 1876, p. 119; Boettger, Zeitsch. ges. Nat. (Giebel) xlix. 1877, p. 287; Bedriaga, Bull. Soc. Nat. Mosc. 1879, no. 3, p. 47; Peters, Mon. Berl. Ak. 1880, p. 308; Blanford, Proc. Zool. Soc. 1881, p. 680; Boettger, Abh. Senck. Ges. xiii. 1883, p. 103; Tristram, West. Palest., Rept. & Batr. 1884, p. 145, pl. xiv.; Boettger, Kobelt's Reiseerin. Alg. u. Tunis, 1885, p. 462; Müller, Verh. naturf. Ges. Basel, vii. 1885, p. 687; op. cit. viii. 1887, p. 271; Blgr. Ann. Mag. N. H. (6) iii. 1889, p. 306; Trans. Zool. Soc. xiii. 1891, p. 151; Hart, Faun. Flor. Sinai &c. 1891, p. 210; Sclater, Snakes Ind. Mus. 1891, p. 49; König, Verh. (S.B.) nat. Ver. Bonn, 1892, p. 24; Tomasini, Wissensch. Mitth. Bosnien u. Herz. ii. 1894, p. 650; Werner, Verh. zool.-bot. Ges. Wien, xliii. (1893) 1894, p. 355; op. cit. xlv. (1894) 1895, p. 85; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 122; Ferreira, Jorn. Ac. Sci. Lisboa, (2) iv. 1895, no. 13, p. 47; Werner, Verh. zool.-bot. Ges. Wien, xiv. 1895, p. 233; Boettger, op. cit. xlv. 1896, p. 279; Bocage, Jorn. Ac. Sc. Lisboa, (2) iv. no. 14, 1896, p. 79; Francaviglia, Boll. Soc. Rom., Zool. v. 1896, p. 38.

*Rhabdodon fuscus*, Fleischmann, Dalmat. Nov. Serp. Gen. 1831, p. 26, pl. 2.

*Coluber vermiculatus*, Ménétr. Cat. Rais. Zool. 1832, p. 72.

*Coluber flexuosus*, Fisch. de Waldh. Bull. Soc. Nat. Mosc. iv. 1832, p. 574.

*Cælopettis monspessulana*, Ranzani, Nov. Comment. Ac. Sc. Bonon. ii. 1836, p. 229, pl. x.; Bonap. Icon. Faun. Ital. 1838, pl. (no number); Mem. Ac. Sc. Torino, (2) ii. 1839, p. 429; Bedriaga, Bull. Soc. Nat. Mosc. 1881, part 2, p. 311; Boettger, Sitzb. Ak. Berl. 1888, p. 177; Ber. Senck. nat. Ges. 1888-89, p. 272; Bedriaga, Instituto, xxxviii. 1890, p. 136; Camerano, Mon. Ofid. Ital., Colubr. 1891, p. 5, pl. ii. figs. 12 & 13; Carruccio, Boll. Soc. Rom., Zool. i. 1892, p. 42; König, Verh. (S.B.) nat. Ver. Bonn, 1892, p. 24; Ferreira, Jorn. Ac. Sc. Lisboa, (2) iv. 1895, no. 13, p. 42; Blgr. Cat. Liz. B. M. iii. 1896, p. 141; Anderson, Herpet. Arabia & Egypt, 1896, p. 108.

*Bothriophis distinctus*, Eichw. Reise Kasp. M. u. Kauk. ii. 1837, p. 748.

*Coluber monspessulana*, var. *neumayeri*, Bonap. Icon. Faun. Ital. 1838.

*Cælopettis vermiculata*, Eichwald, Faun. Casp.-Cauc. 1841, p. 123; Nov. Mém. Soc. Nat. Mosc. vii. 1842, p. 155, pl. xxix. figs. 1 & 2.

*Coluber monspeliensis*, Gervais, Ann. Sc. Nat. (3) x. 1848, p. 205.

*Cælopettis insignitus*, part., Dum. & Bibr. vii. 1854, p. 1130; Jan, Icon. Gén. livr. 34, Mars 1870, pl. i. figs. 2 & 3, et livr. 50, pl. iv. figs. 22-24 (skull).

1 ♂ and 1 ♀. Maryut District.

1 ♂. Alexandria (suburbs).

1 ♂. Mandara. Dr. Walter Innes.



Head moderately long, rather deeply concave in the mesial line from before backwards; canthus rostralis prominent, continuous with an outwardly projecting supraocular; rostral slightly broader than high or as high as broad, slightly visible from above; internasals much smaller than the præfrontals, their suture less than one-half of the length of the suture between the præfrontals; frontal long and narrow, considerably exceeding the distance between its anterior border and the tip of the snout, and as long as the parietal, and its greatest breadth less than one-half of its length; parietals longer than broad, posterior borders usually rounded; two loreals, rarely one, the anterior the smaller, resting on the second and third labials; one præocular, entering largely on to the upper surface of the head, broadly in contact with the frontal; two postoculars, rarely three; temporals 2+3 or 2+4, anterior pair rather large; 8 upper labials, the fourth and fifth entering the orbit, or rarely 9, with the fifth and sixth in the orbit; two pairs of chin-shields of nearly equal size, but the posterior pair the larger, anterior pair in contact with 4 or 5 labials. Scales in 17 to 19 rows, rarely 20, longitudinal mesial line more or less feebly concave. 160-189 ventrals; anal 1/1; subcaudals 68-102.

Pale yellowish olive-brown above, with four broken lines of black spots, each about the size of a scale, at intervals of one or two scales, all the scales being more or less margined with yellowish white. Between the upper lines of spots there are connecting narrow, irregular, not well-defined, whitish cross-bands, which disappear on the hinder part of the body. Ventrals and subcaudals yellowish, finely punctulated with black and marked with large yellowish spots; the first 30 or 40 ventrals almost brick-red, punctulated and tending to form a mesial line. Upper surface of head marbled brown and yellow. Fully-grown individuals uniform, almost blackish, brown above and yellowish or yellowish green below, or spotted above here and there with obscure isolated dark brown spots, some of the margins of the scales, especially those of the sides, with whitish spots; sides of the head with a few yellow spots or markings.

It attains to 1820 millim., of which the tail measures 355 millim.

It appears to be confined to the seaward portion of the delta, and Strauch remarks that in Algeria he found it only near the coast. It is not at all uncommon. I have found it only in the semi-arid land outside Alexandria, and on the sandy and dry semi-cultivated land of the Maryut District.

This species is present in North Africa, from the delta of the Nile to Morocco, and it has recently been recorded from Portuguese Guinea. It occurs around the Mediterranean<sup>1</sup>, from Spain and Portugal to Palestine, the Sinaitic Peninsula and Arabia, also in the islands of Cyprus, Chios, and Lampedusa (Florence Museum), and extends to the Caucasus and to Persia.

It lives on small mammals, birds, and lizards. It has the reputation of being fierce and irascible, but the four specimens I captured did not attempt to defend themselves

<sup>1</sup> It has recently been recorded from the Roman province of Italy.

except by making every effort to escape. The Bedouins who were with me when I captured them seemed to dread this snake as much as they do the cobras, and asserted that its bite was fatal.

I have not been able to ascertain its native name beyond this: that the two Bedouin youths who used to accompany me in searching for snakes, when they saw a large black example of this species shouted out حنش اسود = *hanash aswad* = "black snake," expressing great dread of it. Forskål mentions a snake under this name as harmless.

*Measurements &c. (in millim.) of C. monspessulana, Hermann.*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Pre-oculars.	Relation of preoculars to frontal.	Post-oculars.	Temporals.	Nasals.	Loreal.	Locality.
♀	942	265	170	1/1	93	19	8	4 & 5	1	B. C.	2	2+3	L. 3 <sup>1</sup> R. 2	2	Maryut District.
♂	1100	292	171	1/1	91	19	8	4 & 5	1	B. C.	2	2+3	1	2	"
♂	496	126	174	1/1	101	19	8	4 & 5	1	B. C.	2	2+3	1	2	"
♂	1235	312	177	1/1	94	19	8	4 & 5	1	B. C.	2	2+3	1	2	Alexandria.
♂	1143	290	170	1/1	93	19	8	4 & 5	1	B. C.	2	2+3	1	2	Mandara.

Two figures of this snake appear in the 'Descript. de l'Égypte.' One (Suppl. pl. v. figs. 3<sub>1</sub> & 3<sub>2</sub>) is a very fine figure of an adult of the uniform type of coloration; the second (Suppl. pl. v. figs. 2<sub>1</sub> & 2<sub>2</sub>) is an equally good representation of a half-grown individual. Neither of these figures was dealt with by Is. Geoffroy St.-Hilaire, nor were they identified by Audouin beyond being designated by him "Couleuvres."

The description of the snake *La Couleuvre maillée*, so called because the black spots that ornament its back have been compared to the spots on a young partridge, was drawn up from a specimen. Is. Geoffroy St.-Hilaire linked with his description the poor figure of a snake, fig. 6, pl. vii.; this snake he called *C. insignitus*. Duméril and Bibron, accepting Is. Geoffroy's identification of his snake with the drawing, quote the latter as an illustration of *C. monspessulana*. This I cannot accept, as it appears to me, after a careful study of the figure in question, that Is. Geoffroy was really dealing with the two species, his specimen being *C. monspessulana*, and the figure *C. moilensis*. The drawing does not depict the concave head of the former species, but the shorter

<sup>1</sup> On the left side the nasal is broken up into 3 shields, and the supranasal forms the upper border of the nostril. On the right side the nasal is broken up into 3 shields, but only two portions enter into the formation of the nostril, the lower detached portion, resting on the rostral and on the first and second labials, being excluded. The supranasal and prefrontal define the anterior and upper borders of the nostril.

and forwardly convex head of the latter. The way the colour-markings are represented on fig. 6, pl. vii., is not that of *C. monspessulana*, but that of *C. moilensis*. The large spot between the parietals and the angles of the mouth, so characteristic of the latter species and never present in the former, is portrayed, and the spot likewise that occurs a little way behind it. In *C. moilensis* there is always more or less black at the upper and lower borders of the orbit—absent in *C. monspessulana*, but present in the drawing. The disposition of the spots also on the body is that of *C. moilensis*, and if the drawing I have given in the background of Plate XL., taken from an Egyptian specimen, be compared with the figure in the great French work, the practical identity of the two becomes apparent. Moreover, the somewhat short and broad scales as depicted are rather those of *C. moilensis* than of *C. monspessulana*.

CÆLOPELTIS MOILENSIS, Reuss. (Plate XL.)

*La Couleuvre maillée*, Is. Geoffroy St.-Hilaire, Descr. de l'Égypte, Hist. Nat. i. 1827, pl. vii. fig. 6, *not text*.

*Coluber moilensis*, Reuss, Mus. Senck. i. 1834, p. 142, pl. vii. figs. 1 *a-b*.

*Cælopeltis lacertina*, var., Rüppell, Mus. Senck. iii. 1845, p. 310.

*Coluber insignitus*, *part.*, Dum. & Bibr. vii. 1854, p. 1130.

*Cælopeltis producta*, Gerv. Mém. Ac. Montp. iii. 1857, p. 512, pl. v. fig. 5; Strauch, Mém. Ac. St. Pétersb. (vii.) iv. no. 7, 1862, p. 68; Jan. Icon. Gén. livr. 34, Mars 1870, pl. ii. fig. 2; Blgr. Trans. Zool. Soc. xiii. 1891, p. 151; Anderson, Proc. Zool. Soc. 1892, p. 20; König, Verh. (S.B.) nat. Ver. Bonn, 1892, p. 24; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 122; Werner, Verh. zool.-bot. Ges. Wien, xlv. 1894, p. 85.

*Rhagerhis (Cælopeltis) producta*, Peters, Mon. Berl. Ak. 1862, p. 275, fig. 3.

*Rhagerhis producta*, Gasco, Viagg. in Egitto, pt. ii. 1876, p. 120; F. Müller, Verh. naturf. Ges. Basel, vi. 1878, p. 610; Peters, Mon. Berl. Ak. 1880, p. 308; Murray, Ann. N. H. (5) xiv. 1884, p. 104; Sclater, Snakes Ind. Mus. 1891, p. 26.

*Cælopeltis lacertina*, var. *moilensis*, F. Müller, Verh. naturf. Ges. Basel, vii. 1882, p. 150.

*Cælopeltis moilensis*, Anderson, Proc. Zool. Soc. 1895, p. 656; Herpet. Arabia & Egypt, 1896, pp. 52 & 108; Blgr. Cat. Snakes B. M. iii. 1896, p. 143.

2 ♀. Lower Egypt.

1 ♂. Abu Roash. Mrs. Anderson.

2 ♀. Suakin. Colonel Sir Charles Holled Smith, K.C.M.G., C.B.

1 ♀. Durrur.

Head moderately long, convex above from before backwards; canthus rostralis defined, continuous more or less with outwardly projecting supraocular; rostral as broad as high, largely visible from above; internasals nearly as large as the præfrontals, and the suture nearly as long as that of the præfrontals; frontal long and narrow,



CŒLOPETIS MOILENSIS.

Fig. 1 ♂, Suakin; Fig. 2 ♀, Abu Roash.





equalling or slightly exceeding the distance between its anterior border and the end of the snout, and as long as or a little longer than the parietals; its greatest breadth exceeds one-half of its length; parietals longer than broad, posterior border more or less rounded; one loreal resting on the second and third labials; one præocular, occasionally divided, broadly excluded from contact with the frontal, rarely in contact; two or three postoculars; temporals 2+3, 2+4, or 1+2; 8 upper labials rarely 7, the fourth and fifth entering the orbit; posterior pair of chin-shields the shorter, separated by two large and a few small scales; anterior pair in contact with four or five labials. Scales in 17 rows, very obscurely grooved. 157-176 ventrals; anal 1/1; subcaudals 48-73.

General colour pale sandy yellowish or yellowish brown above, irregularly marked with brown or blackish spots, generally a vertical black bar through the eye, more or less defined and involving the margin of the supraocular and the fourth and fifth labials; a large deep brown or blackish spot from the hinder half of each parietal to the angle of the mouth, with a narrow yellow or whitish area behind it, followed by another but smaller dark brown spot; underparts yellow, with a dark spot occasionally on the angles of the ventrals, and in some two lines of small dusky spots or brick-red spots along the ventrals.

Attains to 1030 millim., of which the tail measures 195 millim.

In Lower Egypt this species is found on the margin of the desert amid arid surroundings. At Suakin and Durrur, where it is not rare, it is found on the shrub-covered grassy plain.

To the west it ranges to Algeria; to the south as far as Sennaar in the Egyptian Sudan. In Asia it is present in Arabia, Syria, and Western Persia.

I have removed a *Stenodactylus elegans* and the remains of beetles from its stomach. The coleoptera had doubtless been introduced in the stomachs of its prey.

The natives do not appear to have any name for it, and indeed, as pointed out by Gasco, they do not distinguish, in some cases, between it and *Cerastes vipera*, which it resembles in its general tint.

*Measurements (millim.) &c. of C. moilensis, Reuss.*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Pre-oculars.	Relation of pre-oculars to frontal.	Post-oculars.	Temporals.	Nasals.	Loreal.	Locality.
♂	445	85	159	1/1	54	17	8	4 & 5	1	B. Ex.	2	2+3	1	1	Abu Roash.
♀	908	152	169	1/1	54	17	8	4 & 5	1	B. Ex.	L. 3 R. 2	2+4	1	1	Suakin.
♀	910	155	174	1/1	54	17	8	4 & 5	1	B. Ex.	2	L. 2+4 R. 1+3	1	1	"
♀	1030	195	173	1/1	55	17	8	4 & 5	1	B. Ex.	L. 2 R. 3	L. 2+3 R. 2+4	1	1	Durrur.
♀	487	129	176	1/1	73	17	8	4 & 5	1	B. Ex.	2	L. 2+3 R. 2+2	1	1	Hadramut.
♂	480	130	170	1/1	63	17	8	4 & 5	1	B. Ex.	2	L. 2+3 R. 2+2	1	1	"
♀	610	139	176	1/1	53	17	8	4 & 5	1	B. Ex.	3-3	2+3	1	1	Aden.
♀	702	154	157	1/1	55	17	8	4 & 5	1	B. Ex.	2-2	2+4	?	?	Lower Egypt.
♀	653	117	166	1/1	52	17	8	4 & 5	1	L. Ex. R. C.	2-2	L. 2+4 R. 2+3	1	1	" "
♀	671	115	159	1/1	48	17	8	4 & 5	1	B. Ex.	..	..	1	1	Duirat, Tunisia.
	663	121	161	1/1	62	17	L. 8, R. 9	L. 4 & 5 R. 5 & 6	1	B. Ex.	..	..	1	1	" "
♀	..	..	172	1/1	64	17	..	..	..	..	..	..	..	..	Maskat.
♀	..	..	168	1/1	52	17	..	..	..	..	..	..	..	..	Bushire.
Hgr.	..	..	176	1/1	59	17	..	..	..	..	..	..	..	..	Nubia.

In the ninth specimen in the foregoing table, five of the ventrals behind the 26th of the series are divided like subcaudals. In the umbilical region of snakes a tendency to division of the plates is rarely present, but complete division of the ventrals in the mesial line so far anteriorly is an exceptional occurrence and worthy of record.



PSAMMOPHIS SCHOKARI.

Fig. 1 ♀, Suakin; Fig. 2 ♂, Margin of Desert, Abu Roash.



## PSAMMOPHIS.

*Psammophis*, Boie, Isis, 1827, p. 521.

Body elongate and cylindrical; tail long and tapered. Head distinct from the neck; snout moderately long; loreal region more or less concave; nostril between two or three plates (rarely a semidivided shield); frontal narrow and rather elongate; loreal elongate; pupil round. Dorsal scales smooth, with apical pits, in 11 to 19 more or less oblique rows; ventrals rounded; anal divided or single. Maxillary teeth in three groups, those of the anterior group, 3 or 4 in number, separated by an interspace from one or two long fang-like teeth, followed by another interspace, the last group terminating in one or two long, strong, grooved fangs placed below the posterior border of the eye; mandibular teeth much enlarged anteriorly, followed by a long line of much smaller teeth, gradually diminishing in size posteriorly.

## PSAMMOPHIS SCHOKARI, Forskål. (Plates XLI. &amp; XLII.)

*Psammophis schokari*, Blgr.<sup>1</sup> Cat. Snakes B. M. iii. 1896, p. 157; Ann. Mus. Civ. Genova, xvi. (xxxvi.) 1896, p. 553; Anderson, Herp. Arabia & Egypt, 1896, pp. 53 & 108; Werner, Verh. zool.-bot. Ges. Wien, xlvii. 1897, p. 407.

? *Psammophis sibilans*, Francaviglia, Boll. Soc. Rom., Zool. v. 1896, p. 35.

- 1 ♀. Aïn Musa.
- 1 ♂. Between Suez and Ismailia.
- 1 ♂. Shaluf.
- 1 ♀. Abbasiyeh. Major-General H. M. L. Rundle, D.S.O., C.M.G.
- 1 ♂. Abu Roash.
- 3 ♂. Gizch.
- 1 ♂. Assuan. Brigadier-General D. F. Lewis.
- 1 ♂ and 1 ♀. Suakin Plain. Surgeon-Captain A. H. Penton, D.S.O.
- 8 ♂ and 4 ♀. Suakin Plain.
- 1 ♂. Tokar.
- 1 ♀. Durrur.
- 1 ♀. Island of Shadwan. Mr. John Strathearn.
- 1 ♀. Ras Gharib. Mr. James Robertson.
- 1 ♂. Berys, S. of Oasis of Khargeh. Major H. G. Lyons, R.E.

<sup>1</sup> Additional references:—Gmelin, Syst. Nat. Linn. i. 1788, p. 1115; Lacép. Quadr. Ovip. iii. 1789, p. 273; Daud. Rept. vi. 1803, p. 251; Shaw's Gen. Zool. iii. 1802, p. 519; Boie, Isis, 1827, p. 547. *Coluber (Natrix) schokari*, Merrem, Syst. Amph. 1820, p. 130. *Psammophis punctatus*, Peters, Mon. Berl. Ak. 1878, p. 207.



Rostral broader than high, but little visible on the upper surface of head; fronto-parietal region in some more or less concave; internasals rounded anteriorly, much shorter and less than half the size of the præfrontals; frontal as long as or somewhat longer than the distance between its anterior border and the end of the snout, its least breadth equal to one-third or less of its length and to about one-half of its anterior breadth; parietals as long as or a little shorter than the frontal, longer than broad, their posterior borders rounded or slightly divergent; two or three nasals, rarely one partially divided; one long and narrow loreal; one præocular, sometimes partially or wholly divided, broadly in contact with the frontal, rarely excluded from it; two postoculars, exceptionally three; 9 upper labials, rarely 8 or 10, the fifth and sixth entering the orbital margin, exceptionally the fourth and fifth or the sixth and seventh. Anterior chin-shields broader but slightly shorter than the posterior pair, in contact with five labials. Scales in 17 rows, rarely 19. Ventrals 162-194; anal 1/1; sub-caudals 95-149.

Either dorsally striped with longitudinal bands of brown and yellow, the stripes in some becoming broken up more or less into black spots, or uniformly coloured with or without spots.

In the striped forms two dark brown bands, more or less margined with black, run from the nostril, through the eye and along the side of the body, to the extremity of the tail; a similarly coloured band begins as a narrow line on the frontal and gradually widening on the nape passes backwards as a broad dorsal band, about 5 scales in breadth, narrowing posteriorly and continued on to the tail to its extremity; the dorsal is separated from the dark lateral band of each side by a yellow or yellowish-orange band, broader than the lateral band and also prolonged on to the tail; under surface and one or more of the lateral scales of the body and the sides of the head whitish or yellowish white; the outer portion of each ventral with two longitudinal parallel lines of blackish spots, the centre of the shields dusky yellowish brown speckled with reddish brown; sides of the head (labials) finely dotted with dark brown, more or less streaked with orange-brown; under surface of the head with numerous dark brown small spots.

In the longitudinally spotted forms the dorsal brown band is reduced to a chain of spots running backwards from each parietal along the body to the tail, and separated from each other about the middle of the body by five longitudinal lines of paler-coloured scales, each spot having an interval of a scale before and behind it; the lateral dark line becomes pale, finely and irregularly spotted with black. A dark brown spot on the side of each ventral and continued on to the tail; two parallel lines of larger and more irregular spots internal to it, separated from each other on the anterior part of the body by a yellowish interspace, darker than the rest of the ventrals and becoming spotted as it is traced backwards, where it becomes faint. The markings on the head and on its under



PSAMMOPHIS SCHOKARI.  
♂, Berys, South of Oasis of Khargeh.



surface the same as in the striped forms. In others, the spots of the dorsal lines become nearly obsolete; also every alternate scale along the mesial line of the back becomes paler than the surrounding scales, so that a vertebral chain of paler scales is present. In such forms the black innermost spots on the ventrals become fine longitudinal lines enclosing a broad dusky ashy space, prolonged to near the extremity of the tail, finely punctulated with minute blackish spots. The head-markings remain intact.

In others the general colour may be pale greyish olive above without black spots feebly indicated, but with a tendency to form a pale dorsal streak here and there. In these forms the head-markings are practically obsolete, but a short narrow dark band is present behind the eye. Under surface of head immaculate. The spots on the angles of the ventrals very feebly marked, also the dark lines, but a broad yellowish band, more or less speckled at its margins, occupies the centre of the ventrals and is continued to the vent, the centre of the first few ventrals with a dark spot. In these uniformly coloured forms the scales are generally finely dotted with black, and snakes of this type of coloration are common in Lower Egypt. Some examples of this species (Island of Shadwan, Assuan, Oasis of Khargeh, and Khartum) are more or less rosy red or reddish brown, without any trace of markings except the line from the nostril to the eye and on the temporal region, and a few spots, all of which become pronounced reddish rosy. The ventrals become bright rosy red and the broad mesial band almost orange-red.

The figures I have given of this species illustrate the extremes of colour-variation. On Plate XLI. there is a representation of the striped form, and in the background a figure of the uniformly greyish-coloured snake finely dotted with blackish, while in Plate XLII. the uniformly rufous variety from the Oasis of Khargeh is depicted. The striped variety with its modifications is especially well represented in the Suakin-Durrur district, where I have never observed snakes exactly corresponding to the greyish or yellowish-olive black-dotted form found in Lower Egypt, and also in Arabia, Persia, and Sind.

The largest male has a total length of 1480 millim., of which the tail constitutes 335 millim.

This species is widely distributed over Northern Africa. It has been recorded from the south as far as Sennaar, and from Eritrea to the east. It is present in Syria, Arabia, and extends from Persia as far east as Sind.

It is found in dry and semi-desert areas, and I have never met with it on the moist alluvial soil of the fields. In Lower Egypt it was generally found under stones on the margin of the desert, but on the plain of Suakin at the roots of bushes.

Its Arabic name is أبو السُّيُور <sup>و. ص. ٢٠٠</sup> = *abu el suyur* = the father of stripes. The natives do not distinguish it from the next species, *P. sibilans*.

In *P. sibilans* the first three lateral rows of body-scales are larger than the other dorsal scales, while the fourth row is about one-half as broad as the first row; but in *P. schokari* there is not the same marked difference between the first and fourth row, and the scales generally are of more equal size as compared with those of *P. sibilans*. In the latter also the oblique arrangement of the scales is more defined than in *P. schokari*, in which the scales are slightly more elongate. The uniformly rufous specimens from the island of Shadwan, Assuan, Khargeh, and Khartum, which at first sight look so remarkably distinct from the striped form, are undoubtedly most nearly allied to it, not only in the character of their scales, but also in the extent to which the rostral appears on the upper surface of the head. In *P. sibilans* the rostral becomes more visible, as it is higher than in *P. schokari*. The rufous snakes, such as those from Khargeh and Khartum, conform to the latter shape of rostral and are unquestionably only a variety of this species. With the exception of the individuals from the island of Shadwan and from Khartum, they have 17 rows of scales, but in these two there are 19 scales round the body. In view, however, of the similarity of these snakes to this species in the characters already indicated, much importance cannot be attached to a trifling variation of this kind. There is another point also in which the Khargeh snake differs from the other three rufous examples of *P. schokari* mentioned in the accompanying table, viz., in possessing 10 upper labials, *i. e.*, one labial more than usually occurs in this species, and two more than the normal number of *P. sibilans*. The additional labial is due to the division of one of the front labials and not to the addition of a labial posteriorly; consequently in this specimen the sixth and seventh labials enter the eye, a condition of the orbital margin found on one side of the head in the Khartum individual, which has only 9 upper labials and is unquestionably inseparable from the Khargeh specimen. In *P. sibilans*, with 8 upper labials, the fourth and fifth generally enter the orbit; but I have met with a snake (see table) presenting these features, but at the same time distinctly referable to *P. schokari*. In the specimen from Jerusalem figured by Jan (livr. 34, pl. iii. fig. 2) as *P. sibilans*, var. *hierosolimitana*, the fourth and fifth labials enter the orbital rim on the left side; but it will be noticed that the second labial is abnormally broad, probably due to the amalgamation of two shields, and, if so, fully accounting for the abnormality of the presence of the fourth and fifth labials below the eye. On the right side of the same figure another abnormal condition exists, brought about by the third labial having so encroached on the fourth, which, although present in the labial margin, is shut out from the orbital rim by the third labial being projected backwards into contact with the fifth.

In 47 examples of this species there is only the afore-mentioned specimen from Gizeh in which the fourth and fifth labials enter the orbit on both sides of the head; whereas in one from Dizak, Baluchistan, the fifth and sixth enter it on one side and the fourth



*Measurements (in millim.) &c. of P. schokari, Forskål, P. leithii, Günth., and Taphrometopon lineolatum, Brandt.*

Sex.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Relation of præoculars to frontal.	Temporals in contact with post-oculars.	Number of nasals.	Locality.
<i>P. schokari, Forskål.</i>										
♂	177	2	..	17	9	5 & 6	B. C.	2	3	Sind.
Juv.	186	2	138	17	9	5 & 6	B. C.	2	3	Karachi.
Juv.	183	2	122	17	9	5 & 6	B. C.	2	2	Kandahar.
Juv.	185	2	..	17	9	5 & 6	B. C.	2	3	Helmand, Afghanistan.
	194	2	126	17	9	5 & 6	B. C.	1	3	Dizak, Baluchistan.
	185	2	110	17	9	5 & 6 4 & 5	B. C.	2	3	" "
♂	194	2	..	17	9	5 & 6	C.	2	3	Hamunto Khusan, Afghanistan.
♂	185	2	126	17	9	5 & 6	B. C.	2	3	" "
♀	182	1/1	127	17	9	5 & 6	B. C.	2	2	Jask, Persia.
♀	183	1/1	..	17	9	5 & 6	B. C.	2	2	" "
♀	185	2	129	17	9	5 & 6	B. C.	2	3	Maskat.
♀	176	2	140	17	9	5 & 6	B. C.	2	2	"
	174	2	..	17	9	5 & 6	B. C.	2	2	"
♂	170	2	141	17	9	5 & 6	B. C.	2	2	Hadramut.
♂	178	1/1	..	17	9	5 & 6	C.	2	2	Lahej, Aden.
♀	168	1/1	149	17	9	5 & 6	B. C.	2	2	Shaikh Othman, Aden.
♀	179	2	103	17	9	5 & 6	B. C.	2	2	Moses Wells, Sinai Peninsula.
♂	177	2	119	17	9	5 & 6	B. C.	2	2	Suez Canal between Ismailia & Suez.
♂	168	2	110	17	9	5 & 6	B. C.	2	2	Shaluf, near Suez.
♀	177	2	..	17	9	5 & 6	B. C.	2	2	Abbasiyeh, Cairo.
♂	176	2	123	17	9	5 & 6	B. C.	2	2	Abu Roash.
♂	175	2	118	17	9	5 & 6	B. C.	2	2	Gizeh.
♂	170	2	113	17	9	5 & 6	B. C.	2	2	"

*Measurements &c. (continued).*

Sex.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Relation of præoculars to frontals.	Temporals in contact with post-oculars.	Number of nasals.	Locality.
♂	173	2	114	17	8	4 & 5	B. C.	2	2	Gizeh.
♀	176	2	114	17	9	5 & 6	B. C.	2	2	Ras Gharib.
♂	192	2	116	19	9	5 & 6	B. C.	2	2	Island of Shadwan.
♂	195	2	111	17	9	5 & 6	B. C.	2	2	Assuan.
♂	188	2	113	19	10	6 & 7	B. C.	2	2	Oasis of Khargeh.
♀	165	2	105	17	9	5 & 6	B. C.	2	2	Suakin.
♂	173	2	100	17	9	5 & 6	B. C.	2	3	"
♀	169	2	93	17	9	5 & 6	B. C.	2	3	"
♂	166	2	100	17	9	5 & 6	B. C.	2	3	"
♂	166	2	100	17	9	5 & 6	B. C.	2	3	"
♂	164	2	..	17	9	5 & 6	B. C.	2	2	"
♀	174	2	105	17	9	5 & 6	0	2	1	"
♂	172	2	106	17	9	5 & 6	0	2	2	"
♂	167	2	105	17	9	5 & 6	B. C.	2	1	"
♂	164	2	96	17	9	5 & 6	B. C.	2	2	"
♂	164	2	96	17	9	5 & 6	B. C.	2	2	"
♂	169	2	97	17	9	5 & 6	B. C.	2	3	"
♀	168	2	97	17	9	5 & 6	B. C.	2	2	"
♀	168	2	96	17	9	5 & 6	B. C.	2	2	"
♂	162	2	95	17	9	5 & 6	B. C.	2	2	Tokar.
♀	173	2	..	17	9	5 & 6	B. C.	2	2	Durrur.
	190	2	120	17	9	L. 6 & 7 R. 5 & 6	..	2	2	Khartum.
♂	179	2	131	17	9	5 & 6	B. C.	2	2	Duirat, Tunisia.
♀	183	2	119	17	9	5 & 6	0	2	2	Biskra, Algeria.

*Measurements &c. (continued).*

Sex.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Relation of preoculars to frontals.	Temporals in contact with post-oculars.	Number of nasals.	Locality.
<i>P. leithii, Günth.</i>										
♂	177	1	95	17	8	4 & 5	L. B. C. R. C.	1	2	Sind. (Type.)
♀	179	1	92	17	8	4 & 5	C.	1	2	Gwalior.
♀	185	1	99	17	8	4 & 5	C.	1	2	Munro Kelat, Baluchistan.
♀	170	1	..	17	8	4 & 5	C.	1	2	Ajmere.
<i>Taphrometopon lineolatum, Brandt.</i>										
♂	181	2	87	17	9	4, 5, & 6	B. C.	2	2	Chinas, Turkestan.
Hgr.	181	2	85	17	9	4, 5, & 6	B. C.	2	2	" "
Hgr.	178	2	74	17	9	4, 5, & 6	B. C.	2	2	" "
Juv.	180	2	83	17	9	4, 5, & 6	B. C.	2	2	" "
Juv.	180	2	90	17	9	4, 5, & 6	B. C.	2	2	" "
♀	175	2	72	17	9	4, 5, & 6	B. C.	2	2	Tirphul, Afghan- istan.
♀	176	2	82	17	9	4, 5, & 6	B. C.	2	2	" "
♂	194	2	98	17	9	4, 5, & 6	C.	2	2	" "
♂	184	2	82	17	9	4, 5, & 6	B. C.	2	2	" "
♂	179	2	82	17	9	4, 5, & 6	B. C.	2	2	Helmand, Afghan- istan.

and fifth on the other. In the remaining specimens, excepting those from the Oasis of Khargeh and Khartum, the fifth and sixth are the labials that assist in defining the orbital rim.

The nasals in this species are subject to variation. In one specimen from Suakin, although there are two nasals on each side, yet the arrangement is different in both. On the left side there is a suture immediately below the nostril and another immediately in front of it, so that one nasal is reduced to a small shield below and behind the opening and embraced by the main shield, the anterior one; on the opposite side the shield is vertically divided through the nostril. In another specimen

there is only one shield, divided only below the nostril. In the nasals of the Suakin snakes the loreal, so to speak, is projected into them, so that there is an emargination of the posterior border of the hinder nasal for its reception.

*Analysis of portion of table referring to P. schokari, Forskål.*

Ventrals.	Subcaudals.	
177-194	110-138	Sind to Persia.
168-185	129-149	Maskat, Hadramut, and Aden.
168-179	103-119	Vicinity of Suez.
173-177	113-123	Lower Egypt.
192	116	Island of Shadwan.
176	114	Ras Gharib.
195	111	Assuan.
188	113	Oasis of Khargeh.
162-174	93-106	Suakin and Durrur.
190	120	Khartum.
179-183	119-131	Duirat and Biskra.

Examples of this species from Aden have a greater number of subcaudals, and those from Suakin and Durrur a smaller number, than is present in those from other localities.

I have included in the foregoing table, in order to bring out their differences, the two Asiatic species *P. leithii* and *Taphrometopon lineolatum*, which have not unfrequently been mistaken for *P. schokari*.

PSAMMOPHIS SIBILANS, Linn. (Plate XLIII. and fig. 12 in text.)

*Serpens africana*, Seba, Thes. ii. 1735, p. 57, tab. 56. fig. 4; Lacép. Serp. ii. 1789, p. 246, pl. xii. fig. 1.

No. 30 *Anguis scutis abd. CLIX vel CLX, sq. caud.* C, Linn. Amœn. Ac. i. 1749, p. 302.

*Coluber sibilans*, Linn. Syst. Nat. ed. x. 1758, p. 222; *part.*, Syst. Nat. i. 1766, p. 383.

*Coluber moniliger*, Daud. Hist. Rept. vii. 1803, p. 69.

*Coluber (Natrix) sibilans*, Merr. Syst. Amph. 1820, p. 114.

*Couleuvre*, Savigny, Descr. de l'Égypte, Rept. Suppl. pl. iv. (1813<sup>1</sup>) figs. 5 1-5 3.

*La Couleuvre oreillard*, Is. Geoff. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. 1827, p. 145, pl. viii. figs. 4-4'.

*Coluber auritus*, Is. Geoff. St.-Hil. op. cit. p. 151, pl. viii. figs. 4-4'.

*Psammophis sibilans*, Blgr. Cat. Snakes B. M. iii. 1896, p. 161; id. Ann. Mus. Civ. Genova, (2)

<sup>1</sup> Although the fourth Suppl. plate of Reptiles bears the date 1813, no reference is made to it by Is. Geoff. St.-Hilaire, whose description of *C. auritus* was written after 1820, as is gleaned from the scattered references in his text to Merrem's work before and after his account of *C. auritus*. In Merrem there is no reference under *C. (N.) sibilans* to the 'Descr. de l'Égypte.'



PSAMMOPHIS SIBILANS.

♂, Abbasiyeh, Cairo.





xvi. (xxxvi.) 1896, p. 553; id. op. cit. xvii. (xxxvii.) 1896-97, p. 13 et p. 279; Ann. & Mag. N. H. (6) xix. 1897, p. 279; Proc. Zool. Soc. 1897, p. 801; Bocage, *Herpét. d'Angola et du Congo*, 1895, p. 114; Journ. Sc. Lisboa, (2) iv. no. 14, 1896, pp. 78, 93, & 113; id. op. cit. no. 15, 1896, p. 177; Boettger, *Zool. Anz.* 1896, p. 119; Anderson, *Herpet. Arabia & Egypt*, 1896, p. 108; Lönnberg, *Bihang till K. Svenska Vet.-Akad. Handl.* 22, Afd. iv. no. 1, 1896, p. 19; Peracca, *Boll. Mus. Zool. Torino*, xi. 1896, no. 255, p. 2, xii. 1897, no. 273, p. 3; Werner, *Verh. zool.-bot. Ges. Wien*, xlvii. 1897, p. 400; Tornier, *Kriechth. Deutsch-Ost-Afr.* 1897, p. 82.

- 1 ♂. Beltim. Surgeon Lieutenant-Colonel Sir J. G. Rogers, D.S.O., K.C.M.G.
- 1 ♂. Northern part of the Delta. J. R. Gibson, Esq.
- 1 ♂ and 1 ♀. Mahallet el Kebir. George Kent, Esq.
- 1 ♂. Abbasiyeh. Major-General H. M. L. Rundle, D.S.O., C.M.G.
- 3 ♂ and 1 ♀. Abu Roash.
- 2 ♂ and 2 ♀. Gizeh.
- 2 ♂ and 1 ♀. Fayum.
- 2 ♂ and 1 ♀. Minia. Major R. H. Brown, R.E., C.M.G.
- 1 ♂ and 1 ♀. Tel el Amarna. Professor W. M. Flinders Petrie, D.C.L.
- 1 ♀. Luxor.

Rostral as high or higher than broad, more visible from above than in the preceding species; internasals rounded anteriorly, half the size of the præfrontals; frontal as long as, or somewhat longer than, the distance between its anterior border and the end of the snout, its least breadth equal to one-third or less of its length, and to about one-half or more of its anterior breadth; parietals as long as, or little shorter than, the frontal, longer than broad, posteriorly somewhat narrowly rounded and slightly divergent. Two or three nasals; one long and narrow loreal; one præocular, either in contact with or excluded from the frontal; two or three postoculars; temporals 2+2, rarely 2+3 or 3+3; eight upper labials, the fourth and fifth generally entering the orbit, and occasionally the fifth and sixth; anterior chin-shields broader, but slightly shorter, than the posterior pair, in contact with five labials. Scales in 17 rows. Ventrals 155-198; anal 1/1; subcaudals 90-116.

Either longitudinally banded with brown and yellow, with or without a pale vertebral line and dark line on the angle of the ventrals, or uniformly coloured above, with or without the pale vertebral line and the dark line on the ventrals.

In the banded forms there is a broad dorsal band of some tint of brown, its borders and the outlines of the scales lying within it margined with blackish; below this dorsal band a narrow yellow band with a broad lateral brownish band below it paler than the dorsal band, the scales in this band also more or less margined with black, and those of the line next the ventrals each usually with a black spot at the apex, but the lower halves of the scales of this row are yellowish like the ventrals. These bands become defined about the region of the twentieth ventral; the sides of the neck anterior to this are nearly of the same colour as the mesial dorsal band, and are

traversed transversely obliquely forwards by a few narrow yellowish lateral lines, becoming most distinct anteriorly and on the temporal region, where they mark off one or two large dark brown patches which have given rise to the term *auritus* applied to this species by Is. Geoffroy St.-Hilaire; one of these yellow lines crosses the posterior portion of the parietals, and another lies behind the eye, involving the postoculars. The præocular has a yellowish spot; upper labials bright yellow or with orange and dark spots; a yellow line traverses the canthus rostralis, at the anterior margin of which it sends an offshoot backwards along the sutures of the internasals and præfrontals to the frontal; lower labials yellow or spotted with bright orange. This mesial yellow line into which the oblique lines pass is not unfrequently prolonged along the entire vertebral line of the snake to opposite the vent. The tail has the five principal bands usually well marked. The under surface from the chin backwards is generally rich yellow, frequently very light below the head and sometimes spotted with light orange; but the angles of the ventrals may or may not have a dark line along them.

In the uniformly coloured snakes the upper surface may be either dark brown or pale greyish brown, without bands of any kind beyond a faint indication occasionally of the yellow narrow vertebral line. The scales in these forms are more or less margined with black, and the head-markings become very obscure, and the dark line along the sides of the ventrals may be found in some, absent in others. In Egypt snakes presenting these different colour-variations are present in one and the same locality; but the snake from Luxor is uniformly brownish above and yellow below, and the head-markings are indistinct, but in this respect it is resembled by snakes from Mahallet el Kebir in the delta and in Fayum. In the first of the last two localities snakes are met with of the striped character, the dark bands very strongly marked, and also the dark lateral line on the ventrals, but with the pale vertebral line, when present, represented only by an interrupted line of yellow spots, but generally one to each scale. Snakes presenting this form of coloration are found in the Nile valley as far south as Wadelai, at Kilimandjaro, and in tropical Africa as far west as Senegal. At Wadelai a type of coloration differing only in some details from the uniform type present at Mahallet el Kebir in the delta is also met with, and is also widely distributed over tropical Africa. It differs from the uniform type of coloration of the deltaic snakes, in which the first row of dorsal scales next the ventrals is yellowish, in having the lateral line of scales coloured like the rest of the upper surface, and in the ventrals, which are yellow in the Lower Egyptian snakes with a dark line, and unfrequently spotted with black, tending to form longitudinal lines. In the uniformly coloured deltaic snakes the lips are immaculate, whereas in the southern uniform type of coloration the upper lip is more or less spotted. The head-markings in both are indistinct.

It attains to 1205 millim. in length, of which the tail forms 390 millim.

*Measurements (millim.) &c. of P. sibilans, Linn.*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Relation of præ-oculars to frontal.	Temporals in contact with post-oculars.	Number of nasals.	Locality.
♂	1000	320	165	1/1	103	17	8	4 & 5	0	2	2	Beltim.
♂	970	310	170	1/1	114	17	8	4 & 5	0	2	2	Delta.
♀	902	260	165	1/1	..	17	8	4 & 5	0	2	2	Mahallet el Kebir.
♀	655	210	168	1/1	109	17	8	4 & 5	C.	2	2	" "
♂	1036	280	166	1/1	..	17	8	4 & 5	C.	2	2	Abbasiyeh.
♂	1028	296	167	1/1	91	17	8	4 & 5	C.	2	2	Abu Roash.
♂	975	300	164	1/1	108	17	8	4 & 5	0	2	L. 1, R. 2	" "
♂	478	..	167	1/1	..	17	L. 9, R. 8	L. 5 & 6 R. 4 & 5	0	2	2	" "
♀	970	229	158	1/1	..	17	8	4 & 5	0	2	2	" "
♀	640	195	165	1/1	108	17	8	4 & 5	C.	2	L. 3, R. 2	Gizeh.
♀	460	138	173	1/1	106	17	L. 8, R. 9	4 & 5	C.	2	2	"
♂	855	265	167	1/1	109	17	9	5 & 6	C.	L. 3, R. 2	2	Fayum.
♂	843	259	159	1/1	103	17	8	4 & 5	0	2	2	"
♀	845	270	166	1/1	109	17	8	4 & 5	0	2	2	"
♂	1205	390	167	1/1	116	17	L. 9, R. 8	L. 5 & 6 R. 4 & 5	0	2	2	Minia.
♂	777	..	167	1/1	..	17	8	4 & 5	C.	2	2	"
♀	645	..	169	1/1	114	17	L. 8, R. 9	L. 4 & 5 R. 5 & 6	0	2	2	"
♂	1131	385	166	1/1	108	17	8	4 & 5	0	2	2	Tel el Amarna.
♀	885	145	171	1/1	..	17	8	4 & 5	0	2	2	" "
♀	967	322	172	1/1	114	17	9	5 & 6	C.	2	2	Luxor.

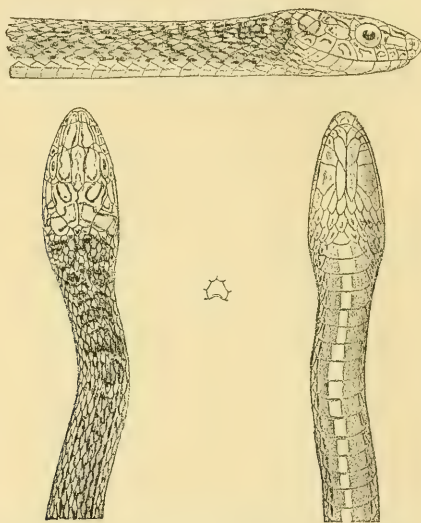
This essentially African species is widely distributed over the continent, from Cape Guardafui to Cape Verd, southwards to the Zambesi and to Angola, and northwards along the Nile valley to the coast of the delta. It is one of the most common snakes in Egypt, and Gasco<sup>1</sup> justly says that in this respect it is on a par with *Zamenis florulentus*. It occasionally enters houses.

<sup>1</sup> Viagg. in Egitto, pt. ii. 1876, p. 120.

The ventrals vary in Eastern Africa from 155-198=43: in Western Africa (Senegal to Angola) from 157-181=24. The range of variation in the subcaudals in Eastern Africa is 90-116=26, and in Western Africa is 97-116=19.

It will be observed from the foregoing table that it is almost invariably the case for the fourth and fifth labials to enter the orbital margin in this species, but that occasionally exceptions occur, and that in these instances it is the fifth and sixth

Fig. 12.

Type of *Coluber sibilans*, Linn. (Upsala Museum.)

labials that take the place of the former, accompanied by nine labials, as in *P. schokari*.

The two species *P. schokari* and *P. sibilans* are closely allied, but at the same time are distinguished from each other by certain generally persistent characters. Thus the rostral of the first is broader than high, and that of the second usually higher than broad. *P. schokari* has nine upper labials; *P. sibilans* eight. In the former, the fifth and sixth upper labials enter the orbit, in the latter the fourth and fifth. As a rule, the præocular in *P. schokari* is broadly in contact with the frontal, while in the second these shields are generally not in contact, or if they do touch, they do so only to a very slight extent.



I am indebted to the courtesy of Professor Lönnberg for the opportunity to give the foregoing figure (fig. 12) of the type of this species preserved in the Museum at Upsala.

It was first described by Linnæus, in 1749, in the account he gave of the contents of the Museum of King Adolphus Frederick in the first volume of the 'Amœn. Ac.' The specimen there appears as "30 Anguis scutis abdominalibus CLX, squamis caudalibus C" (p. 302<sup>1</sup>), but in the more detailed account of the specimen that follows it is stated to have had 160 or 159 ventrals. Mr. Smit counted the ventrals and subcaudals at my request, and he informs me that two countings of the former yielded 159, and two of the latter 100. The anal is divided, and it may possibly be this that led Linnæus to put down the ventrals at 160, while he says at the same time "vel 159." There are 17 rows of scales on the body. The total length of the specimen is 950 millim., of which the tail forms 305 millim. The bottle containing the specimen, which Prof. Einar Lönnberg says is in good condition, bears two labels in the handwriting of Thunberg, Linnæus's successor at Upsala, as follows:—"Coluber sibilans, Mus. Ad. Frid."; and a third, more modern, as follows:—"U. U. Z. M. Linn. Saml. No. 30 Mus. Principis. Coluber sibilans, Psammophis sibilans." Professor Lönnberg says that "the description of the coloration given by Linnæus (Am. Acad. i. p. 303) is very complete, and its correctness may yet be proved on the specimen,"—which is wonderful, considering that it has been almost 150 years in alcohol.

<sup>1</sup> In Linnæus's copy of the first volume of the Amœn. Ac., preserved in the Linnean Society's Library, the word *Anguis* of the above description is erased, and on the margin there occurs, in Linnæus's handwriting, *Coluber sibilans*.

## MACROPROTODON.

*Macroprotodon*, Guichenot, Expl. Sc. Alg., Sc. Phys., Zool. 1850, p. 22.

Body cylindrical, moderately long; tail rather short, about one-fifth or one-sixth the total length; snout short, broad, depressed; rostral much broader than high; nostril between two plates; eye small, slightly vertically elliptic; dorsal scales with apical pits, smooth, in 19 to 25 rows; ventrals rounded; anal divided. Maxillary teeth in two groups: five or six in the anterior group, the last two enlarged, and followed by a wide interspace; the first four of the second group small, the last two much enlarged, fang-like and grooved, placed immediately behind the eye. Mandibular teeth in two groups: the first five small, but increasing in size from before backwards, the last much enlarged, strong and fang-like, and followed by a wide interspace; the nine or ten teeth of the second group small, decreasing in size posteriorly.

## MACROPROTODON CUCULLATUS, Is. Geoffr. St.-Hilaire. (Plate XXXIV. fig. 5.)

*La Couleuvre à capuchon*, Is. Geoffr. St.-Hilaire, Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 148, pl. viii. figs. 3-3 1.

*Coluber cucullatus*, Is. Geoffr. St.-Hilaire, Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 151.

*Coronella lævis*, part., Schlegel, Phys. Serp. ii. 1837, p. 65.

*Macroprotodon mauritanicus*, Gervais, Ann. Sc. Nat. (3) x. 1848, p. 205; Guichen. Explor. Sc. de l'Algérie, Sc. Phys., Zool. v. 1850, p. 22.

*Lycognathus cucullatus*, Dum. & Bibr. vii. 1854, p. 926; Gervais, Mém. Ac. Montpell. iii. 1857, p. 511, pl. v. fig. 2.

*Lycognathus tæniatus*, Dum. & Bibr. vii. 1854, p. 930.

*Lycognathus textilis*, Dum. & Bibr. vii. 1854, p. 931.

*Coronella cucullata*, Günth. Cat. Snakes B. M. 1858, p. 35; Proc. Zool. Soc. 1859, p. 470; Strauch, Mém. Ac. St. Pétersb. (vii.) iv. no. 7, 1862, p. 55; Schreiber, Herp. Europ. 1875, p. 296, fig. 53; Boettger, Abh. Senck. Ges. xii. 1880, pp. 374, 387, et xiii. 1883, p. 96; et in Kobelt's Reisezerin. Alg. u. Tunis, 1885, p. 457; König, Verh. (S.B.) nat. Ver. Bonn, 1892, p. 23; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 120.

*Coronella brevis*, Günth. Ann. & Mag. N. H. (3) ix. 1862, p. 58.

*Psammophylax cucullatus*, Jan, Arch. Zool. Anat. Phys. Modena, ii. 1863, p. 309; Icon. Gén. livr. 19, 1866, pl. i. fig. 3.

*Coronella tæniata*, Strauch, Mém. Ac. St. Pétersb. (vii.) iv. no. 7, 1862, p. 57.

*Coronella textilis*, Strauch, Mém. Ac. St. Pétersb. (vii.) iv. no. 7, 1862, p. 57.

*Psammophylax cucullatus*, var. *textilis*, Jan, Icon. Gén. livr. 19, 1866, pl. i. fig. 4.

? *Oxyrhopus scolopax*, Gasco, Viagg. in Egitto, pt. ii. 1876, p. 120.

*Macroprotodon maroccanus*, Peters, Sitzb. Ges. naturf. Freunde Berlin, 1882, p. 27.

*Coronella (Macroprotodon) brevis*, Reichenow, Sitzb. Ges. naturf. Freunde Berlin, 1883, p. 149.

*Macroprotodon cucullatus*, Blgr. Trans. Zool. Soc. xiii. 1891, p. 149; Cat. Snakes B. M. iii. 1896, p. 175; Anderson, Proc. Zool. Soc. 1892, p. 19; Herpet. Arabia & Egypt, 1896, pp. 109 & 112; Werner, Verh. zool.-bot. Ges. Wien, xlv. 1894, p. 85; Boettger, Verh. zool.-bot. Ges. Wien, xlv. 1896, p. 279.

1 ♂. Maryut District.

1 ♀. Ramleh, near Alexandria.

1 ♀. Mandara. Dr. Walter Innes.

1 ♀. Abukir.

Rostral much broader than high, almost semicircular, slightly visible from above; internasals quadrangular, large, forming a broad suture with the rostral, nearly as long as the præfrontals; præfrontals square; frontal twice as long as broad, elongately shield-shaped, lateral margins very feebly concave; parietals longer than the frontal, rounded behind, slightly divergent; loreal considerably longer than high; præocular broadly excluded from the frontal; two postoculars; temporals 1+2 and 2+2; eight upper labials, fourth and fifth entering the orbit, the sixth either in contact with the parietal or feebly separated from it. 19 (Egypt) to 25 rows of smooth scales across the body; ventrals 152-195; anal 1/1; subcaudals 32-57. General colour greyish or buff-olive, with a dorsal series of brownish or blackish spots separated by pale yellowish or greyish interspaces, the central scales margined with black, and also more or less alternate rows of scales along the sides similarly margined, also the angle of every second ventral. Upper surface of the head wholly brownish or blackish, or only so from between the eyes backwards to the nape, and downwards on to the side of the neck behind the gape; in particoloured heads a dusky band common to the internasals and præfrontals and backwards to the eye, and from below the eye backwards in a narrow line to the dark colour of the nape. Rostral and upper labials yellow. Under surface of the ventrals and subcaudals yellowish or coral-red, either wholly so or the centres marked with dusky square spots, in groups of two ventrals, the intervening ventral with a mesial narrow dusky band connecting two groups.

*Measurements &c. of M. cucullatus, Is. Geoff. St.-Hil. (in millim.).*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Præoculars.	Relation of præoculars to frontal.	Postoculars.	Temporals.	Loreal.	Locality.
♂	365	64	153	1/1	48	19	8	4 & 5	1	B. Ex.	2	1+2	1	Maryut District.
♀	400	64	164	1/1	42	19	8	4 & 5	1	B. Ex.	2	1+2	1	Ramleh.
♀	370	55	168	1/1	43	19	8	4 & 5	1	B. Ex.	2	1+2	1	Mandara.
♀	383	60	167	1/1	43	19	8	4 & 5	1	B. Ex.	2	1+2	1	Abukir.

The largest Egyptian specimen is a female 400 millim. long, of which the tail measures 64 millim. ; but Duméril and Bibron record a specimen 550 millim. in length, with the tail 98 millim.

I have met with this species only along the coast-line near Alexandria. One I found under a stone close to the sea-shore, indeed practically on it, amid the barren surroundings of Canopus, another under an old kerosine-tin on a grassy spot on the otherwise sandy Ramleh, and a third in a barley-field on sandy ground in the Maryut District.

It is distributed over Northern Africa from Egypt to the coast of Mogador, is present in Southern Spain, in the Balearic Islands, and on the island of Lampedusa.

It is said to be one of the most common serpents in Algeria, where Guichenot states that it abounds under stones in thickets and dry and stony places.

It lives on small rodents and lizards.

Dr. Innes informs me that its native name is بسباس = *besbās*.

In Africa the scales vary from 19 to 25. In Egypt they apparently never exceed 19, and five specimens from Tripoli in the British Museum have the same number, while in three from Tunisia two have the same number and one 21. Three of four Algerian examples have 19 scales, and the fourth 20; but in Morocco, from the city to the coast, the two numbers 23 and 25 are alone met with, the latter being exceptional. This numerical increase of the scales in this region recalls what occurs among other reptiles. In Tangier, and at Algeciras on the opposite coast, the number is 21, but in the Province of Andalusia as many as 23 scales are met with.

The extent to which the sixth labial is in contact with the parietal varies considerably, and not unfrequently the two are quite separated by the first temporal becoming wedged in between the two postoculars, and in other instances only with the lower postocular. In the Cairo Museum, I have observed only one specimen out of four in which the sixth labial completely excluded the temporal from the postocular.

The snakes from Tripoli very much resemble the Egyptian snakes in their coloration, but the ventrals are only obscurely spotted. In a Tunisian specimen the black spots of the back and sides become reduced to a mere black margining of the scales in the position occupied by the spots in Egyptian examples, and the ventrals are immaculate. At Hammam Meskoutine, on the Algerian frontier of Tunisia, in a specimen of this species which I obtained there some years ago there is a double line of longitudinally disposed dark brown narrow bars along the mesial line of the back; lying parallel and close together, and external to them, at about the distance of two scales, is a single line of dark bars, and still another between the third and fourth rows of scales, and a black line between the angle of some of the ventrals and the first dorsal scale. Ventral surface immaculate.

In specimens from Tangier, the barring of the back becomes replaced by narrow black margins to the scales in the position occupied by the bars in Algerian specimens.

The spots on the ventrals may be feeble and sparse in some, while in others they are even more strongly developed than in the Egyptian specimens. This type of coloration occurs also in specimens from the city of Morocco, whereas in a specimen (the type of *Coronella laevis*, Gthr.) from an island off the coast of Mogador the coloration recalls the Egyptian snakes, but the ventrals are immaculate. In a specimen with no more detailed indication of its origin than "Morocco," the coloration of the dorsal surface is that of the Hammam Meskoutine individual, but the ventrals are covered with great black spots, and the entire head, upper and under surfaces to the nape, with the exception of a narrow yellowish line along the upper labials, is deep bluish black. The extent to which the black hood is developed is very varied, and in some it is very feebly developed, while in others, such as in Tangier specimens, it becomes broken up into bands, nuchal, transocular, and subocular. In this detail of coloration they are exactly resembled by the Andalucian snakes, which in the coloration of their bodies alone resemble that of the Tangier examples of the species, which differ but little from those of Algeria and Tunisia.



## Series C. PROTEROGLYPHA.

## ELAPINÆ.

## NAJA.

*Naja*, Laur. Syst. Rept. 1768, p. 90.

Body and tail cylindrical, moderately elongate; head rather short, scarcely distinct from the neck; neck generally dilatable; nostril between two nasals and the internasal; no loreal; eye moderate, pupil round; scales smooth, in oblique series, usually most numerous on the neck; anal entire; subcaudals divided or entire. A pair of large grooved poison-fangs at the anterior end of the maxilla which projects distally to the palatine; one to three small grooved teeth at its posterior end; anterior mandibular teeth longer than the posterior.

## NAJA HAJE, Linn. (Plate XLIV.)

- Coluber haje*, Hasselq. & Linn. Iter Palæst. 1757, p. 317; Linn. Mus. Adolph. Frid. ii. 1764, p. 46; Syst. Nat. i. 1766, p. 387; Forskål, Descr. Anim. 1775, p. 14.  
*Coluber niveus*, Linn. Syst. Nat. i. 1766, p. 384.  
*Cerastes candidus*, Laur. Syn. Rept. 1768, p. 83.  
*Coluber candidissimus*, Lacép. Hist. Nat. Serp. ii. 1789, p. 76 et p. 118.  
*Vipera nivea*, Daud. Rept. vi. 1803, p. 39.  
*Vipera haje*, Daud. Rept. vi. 1803, p. 41; Audouin, Descr. de l'Égypte, Hist. Nat. i. ? 1829, p. 184, Rept. Suppl. pl. iii. figs. 11-13.  
*La Vipère haje*, Is. Geoffroy St.-Hilaire, Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 157, pl. vii. figs. 2, 4, & 5.  
*Vipera (Naja) haje*, Is. Geoffroy St.-Hilaire, op. cit. p. 157, pl. vii. figs. 2, 4, & 5.  
*L'Aspic*, Savigny, Descr. de l'Égypte, Hist. Nat. i. Suppl. pl. iii. (dated 1813) ? 1829, figs. 11-13.  
*L'Aspic haje*, Audouin, Descr. de l'Égypte, Hist. Nat. i. ? 1829, p. 184.  
*Naja haje*, Merr. Syst. Amph. 1820, p. 148; Schlegel, Phys. Serp. ii. 1837, p. 471; A. Dum. Rev. et Mag. Zool. 1856, p. 554; Jan, Rev. et Mag. Zool. 1859, p. 129; Peters, Mon. Berl. Ak. 1862, p. 276; Reichen. Arch. f. Natur. 1874, p. 293; Gasco, Viagg. in Egitto, pt. ii. 1876, p. 212; Müller, Verh. naturf. Ges. Basel, vi. 1878, p. 616; Lataste, Le Natural. 1881, p. 371; Peters, Reise n. Mossamb. iii. 1882, p. 137, pl. xx. figs. 7 & 8; Boettger, Abh. Senck. Ges. xiii. 1883, p. 104; Reichenow, Sitzb. Ges. naturf. Freunde Berl. 1883, p. 150; Tristram, West. Palest., Rept. & Batr. 1884, p. 146; Valery Mayet, C. R. Ac. Sc. xcvi. 1884, p. 1296; König, Verh. (S.B.) nat. Ver. Bonn, 1892, p. 24; Boettger, Ber. Senck. Ges. 1893-94, p. 92; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 123; Bocage, Jorn. Sc. Lisboa, (2) iv. no. 14, 1896, p. 100; Tornier, Krichth. Deutsch-Ost-Afr., Rept. & Amph. 1897, p. 84.  
*Uraeus haje*, Wagler, Syst. Amph. 1830, p. 173.



NAJA HAJE.  
♀, Beni Hassan, 1 grown



*Naja (Uraeus) haje*, Rüppell, Mus. Senck. iii. 1845, p. 312.

*Naja haje, part.*, Dum. & Bibr. vii. 1854, p. 1298.

*Naja haje*, var. *annulifera*, Peters, Mon. Berl. Ak. 1854, p. 624; Blgr. Trans. Zool. Soc. xiii. 1891, p. 152.

*Naja haje*, var. A, Güther, Cat. Snakes B. M. 1858, p. 226.

*Naja haje*, var. *viridis*, Peters, Mon. Berl. Ak. 1873, p. 411, pl. i. fig. 1.

*Naia haje*, Cuvier, Règ. An. 1817, ii. p. 82, et nouv. éd. 1829, ii. p. 93; Blgr. Trans. Zool. Soc. xiii.

1891, p. 152; Cat. Snakes B. M. iii. 1896, p. 374; Ann. Mus. Civ. Genova, (2) xvii. (xxxvii.)

1896-97, p. 279; Francaviglia, Boll. Soc. Rom., Zool. v. 1896, p. 35.

1 ♀. Maryut District.

1. Beltim.

1 ♀. Abbasiyeh. Major-General H. M. L. Rundle, D.S.O., C.M.G.

2 ♀. Fields below Pyramids of Gizeh, close to water.

1 ♂ and 1 ♀. Fayum. Major R. H. Brown, R.E., C.M.G.

2 ♀. Beni Hassan. M. W. Blackden, Esq.

1 ♂. Tel el Amarna. Professor W. M. Flinders Petrie, D.C.L.

Neck dilatable; snout moderately broad; rostral as broad as high or somewhat more so, the portion above more or less triangular, equal to about one-half of the distance, or slightly more, between its posterior border and the frontal; internasals smaller than the præfrontals, their mesial suture more than half of the length of the suture between the præfrontals, more or less in contact with the posterior nasal, occasionally excluded by the præfrontals, forming a transverse suture with the præfrontals and with the frontal; frontal about equal in breadth to the supraocular, as long as the conjoint median sutures of the præfrontals and internasals, its anterior breadth equal to four-fifths of its length or nearly so; parietals shorter than the conjoint length of the frontal and of the præfrontal sutures, with some enlarged shields behind them; one præocular, not reaching the upper surface of the head, broadly excluded from the frontal by the præfrontal and supraocular, not touching the internasal; two or three suboculars, almost invariably excluding the third labial from the orbital margin; two, rarely three, postoculars, the two anterior usually in contact with the fourth, fifth, and sixth labials; temporals 1+2 or 3; seven upper labials, exceptionally eight, third higher and broader than the second and fourth, very rarely entering the eye, sixth large, broad, and deep, touching the lower postocular; anterior chin-shields in contact with four lower labials, generally much broader than the posterior pair and somewhat larger, the latter separated by 1+2 scales. 21 to 23 scales across the neck; 19 to 21 across the middle of the body. Ventrals 191-214; anal 1; subcaudals 53-64.

Colour variable: (a) uniform brown above, yellowish below, with a blackish collar, the breadth of about 10 ventrals, beginning on the 15th ventral, dark brown above, black below; a dusky spot under the eye: (b) pale brown above, with a black head, black collar and subocular spot, the body-scales with dark brown margins, giving rise to numerous more or less oblique or transverse lines, most distinctly transverse on the

posterior part of the body; underparts yellowish: (c) uniform brown above with a yellowish-brown head; underparts yellowish white, but each ventral more or less marked with dark brown, completely involving the 4th to the 23rd ventral; caudals margined with dusky brown: (d) uniform brown above, marked with widely scattered yellow spots, generally involving one scale and irregularly alternate, in about twelve series; under surface rich yellowish, each ventral margined with dusky brown; 12th to 24th ventral dark purplish brown: (e) pale brown above, slightly paler on the head, spotted irregularly with dark brown, a spot generally involving only one scale, the broad yellow transverse band on the latter part of the body, and one on the tail; ventrals yellowish white, margined with dusky, the nineteenth to the twenty-eighth purplish brown.

In the first specimen yet recorded from Medina, Arabia, the colour is pale brown, with dark markings tending to be arranged more or less in transverse bands on the posterior part of the body; but besides the deep black collar there is a broad yellowish band anterior to it across the neck, with a central black spot and a black spot on the side of the neck, markings which are never present in Egyptian cobras, but which from their position foreshadow, as it were, the spectacle of *N. tripudians*.

The Egyptian cobra attains to 1790 millim. (*i. e.* practically 6 feet), of which the tail measures 245 millim.

It is very common in Lower and Upper Egypt, and is found both on the alluvium and on the margin of the desert. At Maryut I met with it in barley-fields not far distant from the Lake, and, at Gizeh, on the margins of the backwaters left by the retiring Nile. It is prevalent on the moist fields of the alluvium and occurs close to the sea at Belim. It occasionally enters human habitations, and I have seen a specimen that had been captured in a house in Cairo.

It is distributed over Northern Africa from Egypt to Morocco, along the Nile valley southwards to Mozambique, and from the latter area northwards to Somaliland. It is also present in Southern Palestine and in the North-western Province of Arabia (Medina).

Its food consists largely of batrachians, more especially toads, but it lives also upon rats and mice. It takes freely to water, crossing broad streams. As a rule it is not aggressive.

Some of the members of this genus, like *Sepedon*, are remarkable for the habit they have of ejecting their saliva by an act of forcible expiration when irritated. Pliny<sup>1</sup> has described the *ptyas*, or spitting-serpent, and Ælian<sup>2</sup> doubtless referred to the same habit when he describes the Libyan asp as blinding with its breath those who looked at it. Prosper Alpinus<sup>3</sup>, writing about 14 centuries later, says that there were three kinds of asp in Egypt, and that the spitting-snake *ptyas* was so called

<sup>1</sup> Nat. Hist. 28. 6. 18; 31. 6. 3.

<sup>2</sup> Hist. Anim. iii. 33.

<sup>3</sup> Rerum Ægypt. lib. iv. cap. iv. (1735, 4to).



from its murderous habit of spitting venom on men and animals. The asp and *ptyas* of these writers was the Egyptian cobra.

Although many examples of *N. haje* have passed under my observation, I cannot recall a single instance of one ejecting its saliva to a distance.

Smith<sup>1</sup> has described the spitting-habit of the South-African cobra (*N. flava*, Merr.), and mentions that both natives and Europeans asserted that it could eject its poison, or more correctly its saliva, for several feet. He states that if the fluid should happen to reach the eyes it produced inflammation and not uncommonly loss of sight. Of late years, this habit has been verified in *N. nigricollis*, which is also found in Upper Egypt, and likewise in *N. anchietæ*, each of which, with *N. flava*, merits the term "*cuspidaira*" applied to them by the Portuguese colonists<sup>2</sup> and the equivalent of the "*cracheur*" of the French.

As M. Berenger-Ferand<sup>3</sup> had related many cases of extensive conjunctivitis followed by ulceration of the cornea produced by the ejected saliva of a black serpent on the West Coast of Africa, and known in that region as the "*cracheur*," M. Bavay<sup>4</sup> requested M. Lenaour to try and clear up the matter by conducting some investigations in Dahomey. The latter encountered the serpent on three occasions, and, on two, his bitch had her eyes injured by the liquid ejected by the snake, symptoms of inflammation manifesting themselves in less than two minutes, followed by conjunctivitis and swelling of the eyelids of a grave character, which, however, subsided under treatment in twelve days. He also relates that at Porto Nova, a shopkeeper working in his store received from a black cobra a jet of liquid that brought on violent conjunctivitis. He obtained the head of one of these snakes, which was stated to have been *N. haje*, but it was more likely to be *N. nigricollis*. Professor Bocage<sup>5</sup> has confirmed the habit of spitting in *N. nigricollis* by observations made on a specimen he kept alive for nine months. When irritated it raised the anterior half of its body, curved its head forwards, dilated its hood, and, by an energetic spitting, threw its saliva a certain distance. This has been further verified by the personal experience of M. Petit<sup>6</sup>, who when attempting to seize a specimen of this snake had a quantity of its saliva discharged on to his face and into his eyes, followed immediately by terrible pain in his eyes that lasted for six hours. On the other hand, M. Maclaud<sup>7</sup> mentions a case in which no evil effects happened when the eyes were at once washed with water, and he also states that rats when inoculated with the freshly ejected saliva

<sup>1</sup> Ill. Zool. S. Afr. 1849.

<sup>2</sup> Bocage, Herpét. d'Angola et du Congo, 1895, p. 133.

<sup>3</sup> Arch. de Méd. Navale, lvii. 1892, p. 241.

<sup>4</sup> Bull. Soc. Zool. France, xx. 1895, p. 210.

<sup>5</sup> Herpét. d'Angola et du Congo, 1895, p. 133.

<sup>6</sup> Bull. Soc. Zool. France, xx. 1895, p. 239.

<sup>7</sup> Op. cit. 1896, p. 59.

of this snake were unaffected by it. These experiments prove that the injurious effects of the saliva are caused by the presence in it, in a varying degree, of some irritant substance, probably the secretion of the poison-glands.

One of the names borne by one of the supposed varieties of the common Indian cobra, *N. tripudians*, is *sputatrix*; but Dr. D. D. Cunningham, whose extensive researches in Calcutta regarding the venom of the Indian cobra necessitated the handling and observation of a very large number of specimens, informs me that he has never seen one spit out its saliva.

From November, or about that period, the cobra remains hidden away in some hole underground in a semitorpid state, until the heat of spring returns, when it regains its vigour. In this, however, it is not singular, for in Egypt during winter few reptiles are met with compared with the profusion in which they occur in the height of summer. But the cobra appears to be extremely susceptible to cold, and in Egypt it succumbs to it if left exposed in the open on a cold night even when protected by a covering.

*Measurements &c. of N. haje, Linn. (in millim.).*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Sub-caudals.	Scales.	Upper labials.	Labials entering orbit.	Pre-oculars.	Sub-oculars.	Post-oculars.	Temporals.	Locality.
♀	405	58	213	1	54	21-23	7	..	1	1	2	..	Medina, Arabia.
♀	590	92	211	1	63	21-23	7	..	1	2	2	L 1+4 R. 1+3	Maryut District.
♀	590	101	201	1	61	19-23	7	..	1	2	2	1+3	„ „
♀	632	95	213	1	59	21-23	7	..	1	2	2	1+3	Abbasiyeh.
♀	722	111	207	1	58	21-23	L 7 R. 6	..	1	2	2	1+3	Gizeh.
	790	130	202	1	64	21-23	7	R. 3rd	1	L 3 R. 2	2	1+3	Beltim.
♀	1175	172	205	1	55	21-23	7	..	2	2	L 3 R. 2	1+3	Fayum.
♂	1185	192	197	1	61	21-23	7	..	1	2	2	L 1+5 R. 1+3	„
♂	1293	222	204	1	63	21-23	7	..	1	3	2	1+3	Tel el Amarna.
♀	1380	220	212	1	62	21-23	7	..	1	L 3 R. 2	2	1+3	Maryut.
♀	1445	244	208	1	64	21-23	7	..	L 1 R. 2	L 1 R. 2	2	1+3	Beni Hassan.
♀	1490	115	205	1	..	21-23	7	..	1	2	2	1+3	„ „
	1780	280	208	1	60	21-23	7	..	L 1 R. 2	3	2	1+3	Maryut.
	1790	245	209	1	53	21-23	7	..	1	2	2	1+3	„

The native name is ناسر = *nashir*, meaning "spreading," in allusion to the expansion of the neck when the snake rises to strike or is excited. The Arabs appear to distinguish a number of varieties, for which they have special names. Thus the yellow spotted cobras are seemingly known to them as *bukhakh* and the young as *abu dukur* or *ebnu*. The specific term *haje* applied to this cobra is simply the Arabic حَيَّة = *haiya*, a serpent.

A few interesting variations are present in the shields on the side of the snout. In the fifth specimen there are only 6 labials on the right side, as in *N. nigricollis*, while in the sixth individual the third labial enters the orbital margin on one side of the head as in that species, while on the opposite side (left) the third labial tends to divide and to produce a second præocular as in it. In the seventh specimen a very small shield lies opposite the suture between the præocular and the third labial, thus occupying the position of a præocular, and behind the posterior nasal and between the præocular and the third labial is a minute shield in the position of a loreal. On the right side of the heads of numbers 11 and 13 a small shield is present as a second præocular, and in the former of these two a postocular has fused with a subocular. These variations indicate a very close relationship with *N. nigricollis*, and illustrate a truth always being forced on the observer in dealing with many so-called genera of reptiles, that species are not the well-defined entities that many of them are supposed to be. Some of the foregoing specimens also manifest a distinct tendency to division in the anal.

No systematic investigation into the action of the venom of the Egyptian cobra has yet been undertaken. Panceri<sup>1</sup> made some remarks on the subject about a quarter of a century ago; but there is nothing in his communication of any importance, in view of the researches that have been carried on of late years into the nature of the venom of the Indian cobra, *N. tripudians*.

Sewall<sup>2</sup>, in 1887, showed that animals could be rendered immune to as much as seven times a lethal dose of rattlesnake-venom by previous repeated inoculations of very small quantities of the same poison. A year later Kaufmann<sup>3</sup> made known immunization against the venom of the viper by the same process. In 1891, Kanthack<sup>4</sup>, in his experiments that had been conducted in India, rendered animals resistant to cobra-venom, and experimented with the object of ascertaining whether the serum of animals rendered immune had any antitoxic properties, but the results were negative. MM. Phisalix and Bertrand<sup>5</sup>, three years later, communicated to the Academy of

<sup>1</sup> Bull. de l'Institut. Égypte, Année 1872-1873, no. 12; Expér. sur les effets du venin du *Naja* d'Égypte et du *Ceraste* (Naples, 1873).

<sup>2</sup> Journ. Physiol. viii. 1887, p. 203.

<sup>3</sup> 'Du venin de la Vipère,' Mém. couronné par l'Acad. de Méd. 1888 (Paris, 1889); Mém. Acad. de Méd. xxxvi. fasc. 1<sup>re</sup>, 1891, p. 85; C. R. Soc. Biol. Paris, 1894, p. 113.

<sup>4</sup> Journ. Physiol. xiii. 1892, p. 271.

<sup>5</sup> C. R. Ac. Paris, 1894, p. 356; C. R. Soc. Biol. Paris, 1894, p. 111 et p. 124.

Sciences of Paris the fact that they had been able to confer on guinea-pigs partial immunity to viper-poison by injecting solutions of the venom attenuated by heating it to 80° centigrade, and that the blood-serum of animals so treated possessed antitoxic properties. M. Calmette<sup>1</sup>, a few days later, in a communication to the Biological Society of Paris, stated that the same serum was not merely antitoxic but preventative and therapeutic; and a month later he announced to the Academy of Sciences<sup>2</sup> that he had been able to immunize rabbits, guinea-pigs, dogs, and asses against the venom of a variety of snakes by means of the repeated injections of small doses of venom, and that he had found the serum of animals so treated to be antitoxic. In June, in the following year, Professor T. R. Fraser<sup>3</sup> made known the results of his experiments with the venom of the cobra and other serpents, and the antidotal blood-serum of immunized animals, and in the following month<sup>4</sup> he added some further observations on antidotal blood-serum, or "antivenene," as he proposed to call it, and at the same time communicated some experiments he had made on the ingestion of cobra-venom by animals.

MM. Phisalix and Bertrand<sup>5</sup>, in January 1896, explained their views of the relations that exist between the two methods by which animals may be rendered immune to the action of snake-venom. In both the same mechanism is at work, and it is the same chemical process that creates the refractory condition, the final result consisting in the formation of antitoxic substances—only in "*vaccination*" the defensive reaction of the organism is alone active, and not fettered by the poisons which impede it as in the establishment of immunity by "*accoutumance*," in which the phenomenon is more complex. "*Vaccination*" they define as "*accoutumance abrégée*," and "*accoutumance*" as "*vaccination progressive*."

Dr. D. D. Cunningham has favoured me with the following statement regarding the conclusions that may legitimately be drawn from the data bearing on the establishment of artificial immunity to the action of snake-venom and the protective and curative properties of the serum of the blood of immunized animals. He says:—

"1. The action of any snake-venom on entering the system of a susceptible animal is twofold:—

*a.* It gives rise to intoxication.

*b.* It induces the reactive manufacture of a material counteractive of the action of its toxic constituents.

"2. The latter action is persistent over prolonged periods—certainly, in the case of viperine venom, over periods of at least a year's duration.

"3. In consequence of this persistence it is possible to establish artificial immunity by means of the repeated administration of progressively increased doses of venom. Beginning with the administration of sublethal

<sup>1</sup> C. R. Soc. Biol. Paris, 1894, p. 120 et p. 204; Ann. Inst. Pasteur, 1894, p. 275.

<sup>2</sup> C. R. Ac. Sc. Paris, 1894, p. 720.

<sup>3</sup> Proc. Roy. Soc. Edinb. 1895, p. 448.

<sup>4</sup> *Op. cit.* p. 471.

<sup>5</sup> Bull. Mus. Hist. Nat. ii. 1896, p. 36.



doses the persistent presence of a certain amount of antidotal material within the system is secured. This must serve to convert any normally minimal lethal doses which may be subsequently administered into sublethal ones, and, as the development of antidotal material bears a direct ratio to the amount of venom entering the system, the successive administration of progressively increased doses of venom must lead to corresponding rise in degree of immunity.

"4. The serum of the blood of artificially immunized animals contains the antidotal material on which their immunity depends, and hence the introduction of such serum into the system of non-immunized and susceptible animals must tend to counteract the toxic effects of snake-venom upon them.

"5. But in cases of artificial immunity the quantity of antidotal material in the system appears to correspond closely with the amount of venom to which immunity has been established—there does not appear to be any considerable manufacture of antidote in excess of the quantity necessary to neutralize the toxic action of the amount of venom in relation to which immunity has been established.

"6. Consequently, so long as crude serum is employed as an antidote, in any case in which a non-immunized animal has received a given dose of venom, it must be necessary, in order to neutralize the normal toxic effect, to employ the entire or almost entire serum-contents of the blood of an animal which has been immunized up to the point of resisting a corresponding dose, or, if smaller bulks of serum are to be efficient, to employ serum from animals in which a relatively very excessive immunity has been established.

"7. It follows from this that, whilst treatment with crude serum may be efficient in dealing with cases in which minimal lethal, or slightly supra-minimal lethal, doses of venom have to be counteracted, it is not likely to be of any practical value in dealing with doses of larger amount.

"8. The relative immunity conferred by the introduction of the serum of immunized animals into the system differs from that following the introduction of venom in being very transitory—it depends on the introduction of a ready-made antidote and not on the local manufacture of an antidote within the system.

"9. Artificially established immunity to the action of colubrine venom does not imply the presence of any immunity to the action of viperine venom, and *vice versa*.

"10. The excessive immunity of venomous snakes to the action of snake-venom is not dependent on the presence of any antidotal material within the system of the same nature as that which is developed within the bodies of susceptible animals under the influence of such venom."

The immunity to the venom of snakes claimed by certain sects and tribes of men as the result of the ingestion of the poison is a subject of considerable interest. Not a few travellers and others of unquestionable reliability have recorded that certain peoples of the African continent and of other parts of the globe resort to the practice of drinking the venom of snakes, of eating the poison-glands, and even the snakes themselves, to secure for their persons an immunity from the deadly results usually following the bites of these animals.

Professor Fraser made a series of experiments with the object of determining whether serpent's venom is inert or nearly so when introduced into the stomach of an animal. He administered cobra-venom to a cat, gradually increasing the doses up to eighty times more than a minimum lethal dose, with no evil result. Under this treatment the cat was found to have become protected against cobra-venom, and so much so that one and a half the minimum lethal dose of the poison could be injected subcutaneously with impunity. Moreover, it was discovered that its blood-serum was definitely antivenomous, and the still more remarkable fact was ascertained that her progeny had acquired protection through her milk. Experiments of a like nature were made on



other animals with similar results. The most recent conclusion drawn by Professor Fraser<sup>1</sup> from these experiments is that a degree of protection against lethal doses of the venom of the cobra is acquired in a few hours by the administration of the venom by the stomach, whereas it requires several weeks to establish an immunity to the venom when it is injected under the skin. He also suggested that the results of the experiments on the ingestion of cobra-venom by animals probably afforded an explanation of the alleged immunity to the effects of snake-poison claimed by snake-charmers and certain sects of men.

The immunity induced by the ingestion of cobra-venom he explained on the theory that the poison when it reaches the stomach becomes the subject of an analytical process, in which the poisonous constituent of the venom fails to be absorbed by the blood, whereas the constituent or constituents which are antidotal pass into the blood and so protect the animal against otherwise lethal administrations of venom.

Dr. D. D. Cunningham<sup>2</sup>, who has investigated this subject, records two experiments the results of which are seemingly in direct conflict with those attained by Professor Fraser. A monkey (*Macacus rhesus*) was treated with doses of cobra-venom by the mouth for a period of sixteen months. The ingestion of the venom gave rise to no appreciable symptoms of intoxication, but a minimum lethal dose of cobra-venom finally administered by subcutaneous injection, but how long after the last dose by the mouth had been administered does not appear, produced symptoms of intoxication after an interval of  $4\frac{1}{2}$  hours, and death  $5\frac{1}{2}$  hours later. Another monkey of the same species received by the mouth a dose of 0.2 gramme, *i. e.* 80 times the amount of a minimal lethal dose when administered subcutaneously, but no appreciable result followed. After the expiry of 24 hours, when 0.0025, or a minimal lethal dose, of dried venom was subcutaneously injected symptoms of intoxication developed within two hours and death followed in  $5\frac{1}{2}$  hours later on. Dr. Cunningham, on the strength of these two experiments, says that the second shows that the ingestion of an amount of venom 80 times as great as that constituting a lethal dose when entering the system directly is incapable of producing any appreciable effect on the action of a minimal lethal dose administered subcutaneously 24 hours later, while the first experiment proves that the prolonged and habitual ingestion of smaller quantities of venom is equally inefficacious. He explains the conflicting results of his own and Professor Fraser's experiments on the supposition that, in those cases in which protective effects seem to follow the ingestion of large quantities of venom, they may possibly have arisen in connection with the presence of breaches of continuity or other abnormalities in the surface of the mucous membrane of the alimentary tract allowing of the absorption of a certain amount of crude venom, rather than by an analysis of the venom by the normal digestive apparatus as suggested by Professor Fraser.

<sup>1</sup> Royal Instit. G. Britain, March 1896.

<sup>2</sup> Sc. Mem. Med. Officers Army of India, part x. (Calcutta, 1897).

The principle of administering special preparations of the officinal viper (*Cerastes vipera*) as an antidote to snake-poisoning is one of great antiquity in medicine.

I have not been able to obtain any statistics as to the number of deaths in Egypt attributable to snake-bites.

As the cobra was sacred throughout ancient Egypt and entered largely into the beliefs of the people and into the mysteries of their religion, it is profusely represented on the monuments and tombs. If the tomb of Seti I., for example, be examined, it will be found that the serpents so frequently depicted on it, in a variety of scenes and a diversity of attitudes, some invariably occupying certain positions, are all apparently cobras. In every one of them there is the same conventional pattern in the arrangement of the colour-markings; but many of them, according to the parts they play in the different rituals, have distinctive names so numerous that they recall Ælian's statement that there were 16 kinds of asps. However, if they are compared with the magnificent figure of a cobra by Savigny<sup>1</sup>, it will be seen that the conventional pattern of coloration probably originated from cobras of the type represented by the distinguished French savant. The figures of snakes on the monuments have, however, not always been regarded as representing one and the same species. Champollion, for example, in his 'Panthéon Egyptien,' considered the serpent he regarded as the emblem of the "Bon Génie Cnoupis" to be quite distinct from the *Uraeus asp*, or cobra, with which he held it had nothing in common; but the figure he gives of the serpent of the *Bon Génie*, supported on two human legs, in no way differs from some of the figures on the tomb of Seti I., all of which are seemingly intended for the *Uraeus asp*, and conform to one type of colour-ornamentation, which would not have been the case had more than one species of snake been represented.

Some of the conventional figures of the cobra with distended head in Seti's tomb and similar monuments are of special interest, as they are represented as ejecting fluid from their mouths, so that it would appear that the ancient Egyptians believed in the spitting habit of the cobra, or *ptyas*.

*Naja haje*, which Cuvier says is incontestably the serpent which the ancients described under the name of the *aspic* of Egypt, was sacred to Khnum (Chnoumis) and Rannu. It was known to the Egyptians as *ārā*, the Greek *ὄφας*, and was the determinative or emblem of all goddesses; and, as a sign of royal power, along with the sun's disk, formed part of the headdress of all solar deities. It was also an emblem of the physical sun. Asp-formed crowns were the particular head-dress of Egyptian kings and queens. Towards the twentieth dynasty, when it became a custom to preserve animals, it was embalmed at Thebes and at Sakkarah. The subject, however, is too complex to be dealt with by anyone save a master in Egyptology.

The dilatable neck of the cobra and the erect attitude assumed by the anterior part of the body when the animal is excited, probably originated the myth about the existence of flying serpents in Egypt, mentioned by Herodotus and other authors, ancient

<sup>1</sup> Descr. de l'Égypte, Rept. Suppl. pl. iii.

and modern; but as the *Uraeus asp* was occasionally represented on the monuments with wings, this may possibly have accentuated the belief in such flying monsters.

It is the favourite snake of snake-charmers and jugglers, doubtless owing to the striking attitude it assumes when irritated, and the dread in which it is generally held by reason of the deadly character of its poison.

NAJA NIGRICOLLIS, Reinhardt. (Plate XLV.)

*Vipera* (*Naia*) *haje*, *part.*, Is. Geoffr. St.-Hilaire, Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 157, pl. vii. fig. 3.

*Naia nigricollis*, Blgr. Cat. Snakes B. M. iii. 1896, p. 378; Proc. Zool. Soc. 1891, p. 308; op. cit. 1896, p. 216; Bocage, Jorn. Ac. Sc. Lisboa, (2) iv. no. 14, 1896, pp. 79, 95, et 113, no. 15, p. 178; Blgr. Ann. Mus. Civ. Genova, (2) xvii. (xxxvii.) 1896-97, pp. 13, 21, et 279; Ann. & Mag. N. H. (6) xix. 1897, p. 280; Proc. Zool. Soc. 1897, p. 801; Mocquard, Bull. Mus. Paris, 1896, p. 59; Tornier, Kriechth. Deutsch-Ost-Afr. 1897, p. 84.

*Naja nigricollis*, Günther, Proc. Zool. Soc. 1894, p. 88.

*Naja nigricollis*, var. *occidentalis*, Bocage, Herpét. d'Angola et du Congo, 1895, p. 135.

1 ♀. Assuan.

Neck dilatable; snout broad; rostral much broader than high, the portion above more or less rounded posteriorly, equal to about one-half of the distance between its hind border and the frontal; internasals smaller than the præfrontals, their mesial suture equal to about two-thirds of the length of the suture between the præfrontals, more or less in contact with the præocular, or excluded by the præfrontals, with which and the frontal they form transverse sutures; frontal equal to the breadth of a supraocular, longer than the conjoint sutures of the præfrontals and internasals, its anterior breadth equal to its length or nearly so; parietals as long as the conjoint lengths of the frontal and of the præfrontal suture; two præoculars (occasionally only one), not reaching the upper surface of the head, broadly excluded from the frontal by the præfrontal and supraocular, more or less in contact with the internasal or excluded from it; subocular absent (rarely present); two or three postoculars, the lowest in contact with the fourth labial; temporals 2+3 or 2+5; six upper labials, rarely seven, the third generally enters the orbital margin or may be excluded from it by a separated off portion of itself (subocular); sixth labial long and narrow, at the angle of the mouth; anterior chin-shields in contact with four labials, broader, as long as, or somewhat shorter than, the posterior pair, the latter widely separated by 2 or 3 scales. 21 to 29 scales across the neck; 19 to 25 across the middle of the body. Ventrals 183-228; anal 1; subcaudals 56-58.

General colour of the upper surface (Egypt) moderately pale olive-brown, the skin between the scales almost black; many of the scales towards the hinder part of the body with their bases black and their tips paler than on the rest of the body, this



NAJA NIGRICOLLIS.  
♀, Assuan.







feature being most marked on the tail; ventrals pale yellow, rather profusely punctulated with brown anteriorly, less so posteriorly; three black transverse bands on the under surface of the neck, the first a little way behind the gape, separated from each other by yellowish ventrals, the last band being rather obscure.

This type of coloration, found in snakes from Assuan southwards to the Transvaal, has been indicated by Mr. Boulenger as var. *mossambica*. The var. *pallida* of the same author is "uniform brown above, yellowish beneath; lower surface of the neck brown in the adult; young with a broad black ring round the neck:" it is seemingly distinctive of Somaliland. There is still another variety of coloration which Mr. Boulenger has designated *forma typica*, and which is more or less characteristic of snakes from Gambia to the interior of E. Africa. He has described it thus:—"Dark olive to black above; lower surface of head and neck black; subcaudals and posterior ventrals black, the remainder black and yellow."

This species attains to 2000 millim. in length, of which the tail forms 300 millim.

I met with an example of this species at Assuan, the only one of its kind that has as yet been recorded from Egypt, with the exception of the young specimen figured in the great French work. It extends over Africa from Senegambia to Eastern Somaliland, and from Assuan southwards to Angola and the Transvaal.

*Measurements &c. of N. nigricollis, Reinh. (in millim.).*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labial entering orbit.	Præ-oculars.	Sub-oculars.	Post-oculars.	Locality.
♀	920	145	194	1	53	23-27	3rd	2	L. 1 R. 0	2	Shiré Valley.
♀	1095	189	196	1	61	23-25	3rd	2	0	2	W. Africa.
♀	1275	229	195	1	65	19-22	3rd	2	0	2	Bissao.
♀	1365	191	223	1	55	25-29	L. 0 R. 3	2	0	3	Assuan.

The last specimen in the foregoing table is the one figured (Plate XLV.), and it will be observed that in it the lower præocular is very large, apparently due to the amalgamation with it of portions of the second and third labials. On the left side of the head in the same snake the third labial is excluded from the orbital margin.

The ventrals among 12 examples of this species recorded by Mr. Boulenger vary from 184 to 201, but in the Assuan individual there are as many as 228 ventrals. It is also distinguished by having a greater number (29) of scales round the neck than has yet been recorded, and by a greater number (25) round the body than any of the others, with the exception of one specimen from the Island of Berber.

## WALTERINNESIA.

*Walterinnesia*, Lataste, Le Naturaliste, 1887, p. 411.

Body cylindrical, moderately elongate; tail rather short; head distinct from the neck; neck more or less distensible; canthus rostralis present; nostril defined by two or more nasals and the internasal; loreal absent; eye small, pupil round; scales smooth anteriorly, feebly keeled on the posterior part of the body, strongly so on the tail, without apical pits, 23 rows across the body, more on the neck; anal divided; subcaudals simple anteriorly, divided posteriorly; a pair of large grooved poison-fangs at the anterior end of the maxilla, which projects distally to the palatine; no other teeth behind; anterior mandibular teeth the longest.

## WALTERINNESIA ÆGYPTIA, Lataste. (Plate XLVI.)

*Walterinnesia ægyptia*, Lataste, Le Naturaliste, 1887, p. 411; Blgr. Cat. Snakes B. M. iii. 1896, p. 392; Anderson, Herpet. Arabia & Egypt, 1896, p. 109.

1 ♂. Loc. unknown. Dr. Walter Innes.

Neck more or less dilatable; head rather short and deep; snout moderately broad; rostral very much broader than high, the portion above more or less triangular, and equal to about one-half of the distance between its posterior border and the frontal; internasals about the same size as the præfrontals, their mesial suture about one-third shorter than the length of the suture between the præfrontals, in contact with the posterior nasal; frontal slightly exceeding the breadth of the supraocular, somewhat longer than the conjoint median sutures of the præfrontals and internasals, its anterior breadth about three-fourths its length or nearly so; parietals longer than the conjoint length of the frontal and of the præfrontal sutures; one præocular resting on the third labial, more than twice as long as high, reaching to the canthus rostralis, excluded from the frontal by the præfrontals and supraocular, and in contact with the posterior nasal; one subocular; two postoculars; temporals 2+3 or 3+3 (first variable); seven upper labials, third and fourth, rarely the second, entering the orbital margin; the fifth excluded by the subocular; the sixth occasionally in contact with the lower postocular; third, fourth, and sixth the largest and higher than the others; anterior chin-shields in contact with four labials, twice as long as broad, considerably longer than the posterior pair, but not much broader, the latter separated by two scales. Ventrals 189-197; anal 1/1; subcaudals 45-48, the second to the ninth in single, remainder in double series.

Upper surface dark, somewhat purplish brown, almost black in life; entire under surface dark yellow or brownish.

A male measures 1187 millim. in length, of which the tail forms 168 millim



WALTERINNESIA ÆGYPTIA. ♂.



The only specimens on record of this species were purchased by Dr. Walter Innes from a snake-charmer in Cairo, and there is nothing to fall back upon, beyond the statement of the juggler, to establish it as an Egyptian species. I have made the most careful enquiries about its presence in the neighbourhood of Cairo, without having been able to throw any light upon the subject, and Dr. Innes's endeavours to procure more specimens have been fruitless.

Dr. Innes informs me that the snake-charmer in question said that it was known as *برجيل* = *bargil*.

*Measurements &c. of W. ægyptia, Lataste (in millim.)*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Sub-oculars.	Præ-oculars.	Relation of præ-oculars to frontal.	Post-oculars.	Temporals.	Nasals.	Locality.
♂	1187	168	189	2	48	23-25	7	3rd & 4th	1	1	B. Ex.	2	2+3	L. 3 R. 2	Purchased in Cairo.

The third labial in its upper half enters the orbit much in the same position as does the lower præocular in *N. nigricollis*, and in exceptional cases of *N. haje*. Lataste mentions that in the type of the genus a second præocular was formed on the right side of the head at the expense of the third labial.

The genus *Boulengerina*, Dollo<sup>1</sup>, from Tanganyika, is distinguished from *Walterinnesia* and *Naja*, according to Mr. Boulenger, by the further extension forwards of the palatines. It differs also from the former in the exclusion of the internasal from the nostril, and from the latter by its scales not being oblique in their arrangement.

<sup>1</sup> Bull. Mus. Belg. iv. 1886, p. 159; Blgr. Proc. Zool. Soc. 1895, p. 866, pl. xlviii.; Cat. Snakes B. M. iii. 1896, p. 357.



VIPERIDÆ<sup>1</sup>.

## CERASTES.

*Cerastes*, Wagler, Syst. Amph. 1830, p. 178.

Body cylindrical, stout; tail short; head markedly distinct from the neck, covered with small, more or less tubercular, slightly imbricate scales, with or without supra-ocular appendages; nostrils directed more or less upwards; nasal single or semidivided; eye well-developed, small scales between it and the labials; pupil vertical. Scales in 23-35 rows, those of the back more or less longitudinal, imbricate, with short club-shaped keels not reaching to their tips, those of the sides oblique with serrated keels; ventrals laterally angulate; anal entire, rarely divided; subcaudals double.

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<sup>1</sup> The first two of the four following vipers are mentioned here as they may possibly be found to have a more northerly distribution, and to enter Egypt like *Naja nigricollis* and *Dasypletis scabra*. The second two are noticed for the reasons mentioned under each.

## CAUSUS RESIMUS, Peters.

*Heterophis resimus*, Peters, Mon. Berl. Ak. 1862, p. 277, pl. fig. 4.

This little specialized viper, with its head covered, like a colubrine snake, with symmetrical shields, and with its fangs, as pointed out by Mr. Boulenger, placed in the posterior end of the maxillary, exactly as in the Colubrine Opisthoglyphs, is present at Sennaar. The species was originally described by Peters from a specimen obtained in that locality by Dr. Hartmann. It has since been recorded from Lamu, Mkonumbi, Ngatana, Lake Tanganyika, and Angola.

## BITIS ARIETANS, Merrem.

Rüppell obtained the puff-adder in Kordofan, and Dr. A. Hartmann (Reise durch Nordost-Afr. 1859-60 (1863) p. 283) met with it on his and Baron von Barnim's journey across the Bayuda desert from Debbeh to Khartum. Marno records its presence on the sands of the steppes of Kordofan, near the Nile.

Attention may be here called to the fact that the highly specialized viperine genus *Atractaspis*, with great poison-fangs, but with its palatine and mandibular teeth nearly suppressed, is represented at Wadelai by two species, viz. *A. irregularis*, Reinh., and *A. aterrima*, Günther.

## VIPERA AMMODYTES, Linn.

Linnæus, in the 'Amœnitates Academicæ' (vol. i. 1749, p. 506, pl. xvii. fig. 2; Syst. Nat. i. 1766, p. 376), recorded *Vipera ammodytes* from Libya on the authority of Jonston (Hist. Quadr. et Serp. lib. ii. 1657, p. 11, tab. i. fig. *ammodites*), who quoted Solinus as the source of his information.

A closely allied species to *V. ammodytes*, viz. *V. latastii*, Boscá, is present in Algeria, but how far it ranges to the east is unknown. It may possibly extend into Libya; but, however this may be, it is quite certain that no viper with an erect nasal appendage has ever been recorded from Egypt. Daudin states that



CERASTES VIPERA.  
♂, Sandy Desert, Gizeh.



## CERASTES VIPERA, Hasselq. &amp; Linn. (Plate XLVII.)

- Vipera officinarum*, Hasselq. Act. Soc. Reg. Sc. Upsala (1750), 1751, Index.  
*Vipera*, Hasselq. op. cit. p. 24.  
*Vipera ægypti et officinarum*, op. cit. p. 24.  
*Vipera ægyptiaca*, Hasselq. op. cit. p. 26 et pp. 27, 28.  
*Coluber vipera*, Hasselq. & Linn. Iter Palest. 1757, p. 314; Linn. Mus. Adolph. Frid. ii. 1764, p. 43, et Syst. Nat. 1766, p. 375; Bonnaterre, Encyclopéd. Méthod., Ophiol. 1790, p. 21; Gmelin, Linn. Syst. Nat. i. 1788, p. 1085; Shaw, Gen. Zool. iii. part 2, 1802, p. 377.  
*Aspis cleopatra*, Laur. Syst. Rept. 1768, p. 105.  
 ? *Coluber hölleik*, Forskål, Descr. Anim. 1775, p. viii et p. 15.  
*Coluber ægyptiacus*, Lacép. Quad. Ovip. ii. 1789, p. 63.  
*Vipera ægyptia*, Latr. Rept. iii. 1801, p. 312.  
*Vipera ægyptiaca*, Daud. Rept. vi. 1803, p. 212, et viii. 1803, p. 395; Boie, Isis, 1827, p. 559.  
*Vipera (Echidna) ægyptiaca*, Merr. Syst. Amph. 1820, p. 152.  
*Cerastes ritchei*, Gray, Zool. Misc. 1842, p. 70; Cat. Snakes B. M. 1849, p. 28.  
*Echidna atricauda*, part., Dum. & Bibr. vii. 1854, p. 1430.  
*Vipera avicennæ*, part., Jan, Rev. et Mag. Zool. 1859, p. 152; Icon. Gén. livr. 45, Juin 1874, pl. v. fig. 4.  
*Vipera avizennæ*, Strauch, Mém. Ac. St. Pétersb. (vii.) xiv. no. 6, 1869, p. 113 et p. 138.  
*Vipera cerastes*, Gasco, part., Viagg. in Egitto, pt. ii. 1876, p. 120.  
*Vipera (Cerastes) cleopatra*, Boettger, Kobelt's Reiseerin. Alg. u. Tunis, 1885, p. 463.  
*Cerastes vipera*, Blgr. Trans. Zool. Soc. xiii. 1891, p. 155, pl. xviii. fig. 2; Cat. Snakes B. M. iii. 1896, p. 503; Anderson, Proc. Zool. Soc. 1892, p. 23; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 125; Werner, Verh. zool.-bot. Ges. Wien, xlv. 1894, p. 86; Anderson, Herp. Arabia & Egypt, 1896, p. 109; Francaviglia, Boll. Soc. Rom., Zool. v. 1896, p. 39.

in his time it was unknown from Egypt. At the same time *V. ammodytes* is present in Syria, having been found by Canon Tristram on the slopes of Lebanon.

## VIPERA LEBETINA, Linn.

The viper known under this name was first described by Linnæus, in the 10th edition of the 'Systema Naturæ,' from a specimen said to have been collected by Hasselquist. It is not mentioned in the 'Iter Palestinum,' in which, however, Hasselquist refers to a snake he had observed in Cyprus under the name of *aspic*, that is one of the names under which *V. lebetina* is known in that island, another name being *κοιφην* = deaf (adder). In the 10th edition of the 'Syst. Nat.,' no more explicit locality is assigned to *V. lebetina* than "Habitat Oriente"; but in the Catalogue of the Museum of King Adolphus Frederick, *V. lebetina* is stated to be found in Arabia and Egypt. Forskål's specimens are explicitly stated by him to have been received from Cyprus. There is no specimen of this species from Egypt, so far as I have been able to ascertain, in any European museum. Strauch stated he had seen a specimen in the Berlin Museum; but Dr. G. Tornier informs me that no such specimen exists, though there is one labelled "North Africa," but by whom presented is unknown.

- 5 ♂ and 1 ♀. Desert on east side of Suez Canal, between Suez and Ismailia.  
 1 ♂. Desert on west side of Suez Canal, between Suez and Ismailia.  
 4 ♂ and 2 ♀. Desert around Cairo.  
 2 ♂. Desert, Abu Roash.  
 1 ♂. Desert, Gizeh. R. G. Gallop, Esq.  
 1 ♂. Desert, Gizeh.  
 1 ♂. Desert, Beni Hassan. M. W. Blackden, Esq.  
 1. Ras Gharib. Mr. James Robertson.

Snout broad and short, its length considerably less than the breadth between the eyes superiorly and anteriorly; rostral much broader than high, its height equalling one-third of its breadth, deeply concave from side to side above its lower border; nasal plates small, generally two, separated from the rostral and front labial usually by two rows of scales, and from one another above by four to six scales; nostril directed outwards and backwards; a slightly enlarged scale sometimes above the nasal; eye moderate, its diameter about one-half the length of the snout, separated from the upper labials by three to four rows of scales; nine to fourteen rows of scales round the eye; no appendages over the eyes; no enlarged tubercular scales in pairs on the mesial line of the head; scales on the upper surface of the head unequal, more or less slightly elongate, with a short tubercular keel; 11-12 upper labials, rarely 13; one pair of large oval chin-shields, separated by loose skin, in contact with three or four labials. 23 to 27 rows of scales across the body. 102-122 ventrals (Egypt 108-119), with a well-defined lateral keel; anal 1, rarely divided; subcaudals 18-26, distinctly keeled, terminal scale short, curved, and claw-like. General colour sandy yellow or pinkish, with a dorsal series of about 28 brown spots arranged more or less in alternate longitudinal series, frequently absent on the neck, less numerous but more pronounced on the posterior part of the body, but sometimes nearly obsolete; rarely two divergent dusky lines on the temporal region; tip of tail not unfrequently deep black; underparts yellowish white.

The largest Egyptian male measures 345 millim. in length, of which the tail forms 30 millim.

This species is common on the margin of the desert around Cairo and on the Isthmus of Suez. It is also present in Middle Egypt, and will probably be found much further to the south. From Egypt it extends over the Sahara to Algeria.

Nothing is known regarding its habits. I have frequently found it lying in the sun among sand and stones. Dr. Walter Innes informs me that its native name is حايه كراة = *haiya karaa*.

Forskål's description of his *C. hölleik* leads me to suppose that he had this species in view. It seemingly refers to a viper, and the only real viper of the size he mentions existing in Arabia is this species. Hasselquist informs us that this was the official viper, from which a certain preparation was made for consumption in Egypt and in



*Measurements &c. (in millim.) of C. vipera, Hasselg. & Linn.*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials below eye.	Scales between labials and eye.	Locality.
♂	225	30	108	1	25	25	12	5, 6, & 7	3	Eastern desert between Suez and Ismailia.
♂	236	26	109	1	20	25	L. 13 R. 12	5, 6, & 7	4	" "
♂	226	22	111	1	21	25	11	6 & 7	3	" "
♂	260	20	117	1	22	25	L. 12 R. 13	6 & 7	4	" "
♀	270	22	113	1	22	25	12	L. 5 & 6 R. 5, 6, & 7	3	" "
♂	241	25	110	1	26	25	11	5 & 6	L. 4 R. 3	Desert west of Suez Canal.
♂	345	30	119	1	22	25	12	6, 7, & 8	4	Desert, Gizeh.
♂	270	..	109	1	..	25	11	5 & 6	3	" "
♂	270	30	116	1	23	25	11	L. 4, 5, & 6 R. 5 & 6	3	Desert, Abu Roash.
♂	260	29	112	1	23	25	12	L. 6, 7, & 8 R. 5, 6, & 7	3	" "
♂	225	26	117	1	26	27	L. 12 R. 11	6 & 7	3	Beni Hassan.
♂	315	32	114	1	23	25	12	5 & 6	4	Neighbourhood of Cairo.
♀	308	23	118	1	20	25	11	5 & 6	4	" "
♂	320	37	112	1	25	25	13	5 & 6	4	" "
♂	322	29	113	1	23	25	11	5, 6, & 7	4	" "
♂	306	34	113	1	23	25	L. 12 R. 11	6 & 7	4	" "
♀	282	28	116	1	25	25	12	5 & 6	4	" "

Europe, and that quantities were exported to Venice. This drug was known to the ancients as *theriaca* or *teriaca*. One of its most esteemed actions was that of an antidote to snake-poison and to poisons in general. Prosper Alpinus states that during his residence in Egypt (1581–1586) the physicians of that country were making viper-pills from the flesh of *Cerastes cornutus*.

## CERASTES CORNUTUS, Hasselq. (Plate XLVIII.)

- Coluber cornutus*<sup>1</sup>, Hasselq. Act. Soc. Reg. Sc. Upsal. 1750, pp. 27–28; Hasselq. & Linn. Iter Palest. 1757, p. 315.
- Vipera cornuta*, Hasselq. Actes Soc. Reg. Sc. Upsal. 1751, p. 27.
- Coluber cerastes*, Linn. Syst. Nat. i. 1766, p. 376; Ellis, Phil. Trans. lvi. 1767, p. 287, pl. xiv.; Gmelin, Linn. Syst. Nat. 13th ed. i. p. 1087; Bonnaterrre, Encyclopéd. Méth., Ophiol. 1790, p. 20, pl. xxxv. fig. 1; Shaw, Nat. Misc. iv. 1792, pl. cxxii.; id. Gen. Zool. iii. pt. 2, 1802, p. 385, pl. ciii.
- Beschasch Datan cornuta*, Forskål, Descr. An. 1775, p. ix.
- Cerastes cornutus*, Forskål, Descr. Anim. 1775, p. ix; Blgr. Trans. Linn. Soc. xiii. 1891, p. 155; Cat. Snakes B. M. iii. 1896, p. 502; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 125; Werner, Verh. zool.-bot. Ges. Wien, xliii. 1893, p. 359, et xlv. 1894, p. 86; op. cit. xlvii. 1897, p. 407; Anderson, Herpet. Arabia & Egypt, 1896, p. 109.
- Le Céraste*, Lacép. Hist. Nat. Serp. 1789, p. 72, pl. i. fig. 1.
- Cerastes or Horned Viper*, Bruce, Travels, v. Append. 1790, pp. 198–210, plate.
- Gehörnte Natter*, Bechstein, Lacép. Naturgesch. Amph. iii. 1800–1802, p. 220, pl. iii. fig. 2.
- Vipera cerastes*, Latr. Rept. iii. 1802, p. 313, pl. fig. 2; Daud. Rept. vi. 1803, p. 178, pl. 74. fig. 2; Eichw. Zool. Sp. iii. 1831, p. 172; *part.*, Schlegel, Phys. Serp. 1837, p. 585, pl. xxi. figs. 12 & 13; Wagner's Reis. Alg. iii. 1841, p. 139; Eichw. Nouv. Mém. Soc. Nat. Mosc. ix. p. 438; Gervais, Ann. Sc. Nat. (3) x. 1848, p. 205; Strauch, Mém. Ac. St. Pétersb. (vii.) iv. 1862, no. 7, p. 72; op. cit. (vii.) xiv. 1869, no. 6, p. 108 et p. 138; Jan, Icon. Gen. livr. 45, Juin 1874, pl. v. fig. 1; Gasco, *part.*, Viagg. in Egitto, pt. ii. 1876, p. 120; Müller, Verh. naturforsch. Ges. Basel, vi. 1878, p. 619; Bedr. Bull. Soc. Nat. Mosc. 1879, no. 3, p. 50; Boettger, Ber. Senck. nat. Ges. 1880, p. 169; Peters, Mon. Berl. Ak. 1880, p. 308; König, Verh. (S.B.) nat. Ver. Bonn, 1892, p. 25.
- Echidna atricauda*, *part.*, Dum. & Bibr. vii. 1854, p. 1430.
- Le Céraste*, Cuv. Règ. An. ii. 1817, p. 85.
- Vipera (Echidna) cerastes*, Merr. Syst. Amph. 1820, p. 150.
- La Vipère céraste*, Is. Geoffr. St.-Hilaire, Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 155, pl. vi. fig. 3.
- Le Céraste ou Vipère cornue*, Cuv. Règ. An. ii. nouv. éd. 1829, p. 91.
- Cerastes hasselquistii*, Gray, Zool. Misc. 1842, p. 70; Cat. Snakes B. M. 1849, p. 28; Günther, Cat. Snakes B. M. 1858, p. 268; Tristram, West. Palest., Rept. & Batr. 1884, p. 147; Slater, Snakes Ind. Mus. 1891, p. 68.
- Vipera (Cerastes) cerastes*, Rüppell, Mus. Senck. iii. 1845, p. 313; Boettger, Kobelt's Reiserin. Alg. u. Tunis, 1885, p. 463.
- Cerastes ægyptiacus*, Dum. & Bibr. vii. 1854, p. 1440, pl. 78 bis, fig. 3; Peters, Mon. Berl. Ak. 1862, p. 278; Westphal-Castel. Cat. Col. Rept. 1869, p. 47.
- Vipera avicennæ*, Jan, Icon. Gén. livr. 45, Juin 1874, pl. v. fig. 3.

<sup>1</sup> In the 12th ed. of the 'Syst. Nat.' Linnæus, in a footnote to p. 375, says of the above-named species:—  
 "Vipera cornuta, Hasselq. Act. Up. 1750, p. 27, est fictitius Coluber astu Arabum, qui unguibus aviculae  
 pertuserunt caput eidemque inseruerunt."



CERASTES CORNUTUS.

♂, Assiut.



*Males with horns.*

- 1 ♂. Assiut.
- 2 ♂. Suakin. Surgeon-Captain R. H. Penton, D.S.O.

*Hornless males.*

- 2 ♂. Luxor.
- 1 ♂. Wādī Halfa. Major Henry d'Alton Harkness.
- 1 ♂. Ras Gharīb. Mr. James Robertson.

*Females with horns.*

- 1 ♀. Desert east of Suez Canal.
- 1 ♀. Desert at Gizeh Pyramids.
- 1 ♀. Desert, Luxor.
- 3 ♀. Plain of Suakin. Colonel Sir C. Holled Smith, K.C.M.G., C.B.

*Hornless females.*

- 5 ♀. Desert, Luxor.

*Hornless, sex unknown.*

- 1. Luxor.
- 1. Wādī Halfa. Major Henry d'Alton Harkness.
- 1. Ras Gharīb. Mr. James Robertson.

Snout broad and short, its length considerably less than the breadth between the eyes superiorly and anteriorly; rostral transversely linear, its height equalling about one-third of its breadth, deeply concave from side to side above its lower border; nasal plate small, separated from the rostral and first labial by generally two rows of scales; nostril directed upwards and backwards; a slightly enlarged scale above the nasal; nasals separated by six or seven scales; fifteen to twenty scales between the orbital margins superiorly; eye moderately large, its diameter considerably less than one-half the length of the snout, separated from the upper labials by about five rows of scales; fourteen to eighteen scales round the eye; an erect, furrowed, slightly backwardly curved appendage above each orbit, equal to about the length of the snout, present or absent; usually a pair of juxtaposed enlarged rounded scales on the mesial line of the head slightly anterior to the eyes, and another similar pair on the occipital region, each scale with a strongly pronounced, central, tubercularly conical eminence; scales on the upper surface of the head generally unequal, small, more or less round, with a short tubercular keel. 12-15 upper labials; one pair of large oval chin-shields, separated by loose skin, in contact with three labials; 28 to 35 rows of scales across the body. 130-165 ventrals (Egypt 140-151); anal single, rarely or partially divided; subcaudals 28-42 (Egypt 29-40), more or less obtusely keeled posteriorly, terminal scale conical. General colour sandy yellow, either nearly uniform or with 30 to 36 rows of dark brown spots, either in four or six oblique or transverse series, frequently confluent and in some producing a checkered appearance, the pale interspaces in some



having a more or less brownish tint; head immaculate or spotted with dark brown; generally a dark brown oblique band from behind the eye, very distinct in some, obscure in others, and occasionally an oblique spot below the eye; under surface yellowish; tip of tail occasionally blackish.

It (♂) attains to 735 millim. in length, of which the tail forms 55 millim.

This species is common on the margin of the desert along the Nile, and has been recorded from the Bayuda desert and as far south as Sennaar (Bruce). It occurs also along the shores of the Red Sea from Suez to Suakin, and is therefore probably distributed all over the region between the Nile and the Red Sea. On the west of that river it is in all likelihood spread over the entire Saharian desert and its oasis. Bruce found it to be extremely common in Cyrenaica, and it also occurs in Tunisia and Algeria. It is present in Arabia (Sinaitic Peninsula and Hadramut) and in Southern Syria.

Its food consists of small rodents, such as members of the genera *Mus*, *Gerbillus*, and *Jerboa*. Bruce, on the only occasion in which he met with an animal in the stomach of this species, found a *Jerboa*<sup>1</sup>.

Its habit is to conceal itself in the sand of the desert, only its eyes and the upper part of its head being visible. This was known to Pliny<sup>2</sup>, who, however, says that it often had two pairs of horns<sup>3</sup>, and that these organs were to entice birds<sup>4</sup> to it; and Belon fancied that he saw in them a resemblance to grains of barley! Daudin suggests that it was probably owing to this supposed likeness that Pliny and Solinus described the *Cerastes* as hiding under leaves.

The majority of the specimens collected by me were dug out of holes that might have been tenanted by rodents. Bruce styles this viper the companion of the *Jerboa*, and there can be no doubt that it is generally found in localities in which that rodent abounds, associated with others, such as *Mus* and *Gerbillus*, all of which are either crepuscular or nocturnal in their habits, like the viper itself. Wilkinson<sup>5</sup> mentions that he met with an example of this species on the island in the middle of Lake Mœris, a rather remarkable place in which to find a viper, as these snakes do not, as a rule, enter water, at least they are generally credited with not doing so. According to Bruce this snake is able to endure the absence of food for a very long period, as

<sup>1</sup> Travels, v. 1790, Appendix, p. 202.

<sup>2</sup> Hist. An. viii. 23.

<sup>3</sup> Wilkinson (Anc. Egypt, iii. 1878, p. 339) mentions that snake-catchers in his day offered horned vipers for sale with four horns, the extra pair being clearly introduced beneath the scales. Others he mentions had occasionally long flowing hair on their heads.

<sup>4</sup> Viperine snakes have not generally been credited with the above habit of capturing birds, but that the true vipers occasionally do so is proved beyond doubt by the fact recorded by Günther that he removed a *Saxicola* from the stomach of *V. lebetina* (Proc. Zool. Soc. 1879, p. 741).

<sup>5</sup> Ancient Egyptians, iii. 1878, p. 339.

he mentions that he kept two in a glass jar, such as is used for sweetmeats, for two years without giving them any food. When disturbed, it attacks with great energy, throwing itself forward by a bound for some distance. At first it rasps its coils one against the other, producing the sound characteristic of itself and *Echis*, and when the irritation passes endurance the viper suddenly, by the rapid straightening of its body, launches itself forwards. I have stood with a crowd of Arabs around one of these vipers (all, however, at a respectful distance from it), and angered it with a long switch I carried with me to stun snakes, when it would spring forwards and scatter the crowd in every direction. Prosper Alpinus's account of the snake described by him under the name *Acontia* or *Jaculum* recalls the horned viper. He says it was so called *Jaculum* because it darted like a spear and was very deadly, a description in no way applicable to the mild snake *Eryx*, to which Hasselquist, having mistaken it for *Cerastes*, applied the term *Jaculus*.

Little is known regarding the action or potency of the poison of this snake, or that of its fellow *C. vipera*. Bruce records a case of a snake-catcher bitten between the first finger and the thumb by a *Cerastes cornutus* that had sprung a distance of three feet and fastened itself on the man's hand. The man so far from dying did not appear to suffer in any way from the bite, neither did he take any precautions against its effects. He was fully four hours under Bruce's observation; and as he escaped any evil effects of the bite, are we to suppose that he had been immunized? The very snake that bit him was made by Bruce to bite a pelican in the thigh, and it died in thirteen minutes. He also relates that he saw a man at Cairo take hold of a *Cerastes cornutus* by the neck, that had previously killed a fowl, and beginning at its tail eat it just as one would eat a carrot or a stalk of celery. Drummond-Hay gives an almost similar account of a snake-eating performance he witnessed in Barbary, in which the man was bitten in the hands and neck by the poisonous snake he was devouring. Such cases as these merit recollection in view of the facts that have been recently adduced regarding the immunization of animals to snake-venom.

The poison seems to be destructive to small mammals and to birds even as large as a pelican, but that it is deadly to man remains yet to be ascertained, and the same may be said of the poison of the little *C. vipera*. Berthoud<sup>1</sup> found that its bite was less dangerous than that of *Vipera lebetina*.

Dr. Walter Innes informs me that the horned viper is known as <sup>حبة حرة أو حبة بالقرون</sup> *haiya hurra* or *haiya bikurûn*=horned snake. I have also heard it called <sup>حبة جبلي</sup> *haiya gebeli*=snake of desert. Sir J. G. Wilkinson speaks of the hornless *Cerastes cornutus* as *dashâsh*, possibly the same word as *bæschasch* of Forskål.

<sup>1</sup> Rev. Zool. 1848, p. 74.

*Measurements &c. (in millim.) of C. cornutus, Hasselq.*

Sex.	Total length.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials below eye.	Scales between labials and eyes.	Horns.	Locality.
♀	376	39	145	1	33	32	12	6, 7, 8	5	Horned.	Desert east of Suez Canal.
♀	300	38	148	1	39	28	12	5, 6, 7, 8	5	Horned.	Desert, Gizeh Pyramids.
♂	735	55	146	1	38	28	14	7, 8, 9	5	Horned.	Desert, Assiut.
♂	540	73	142	1	38	28	13	7, 8, 9	5	Hornless.	Desert near Luxor.
♀	495	64	149	1	40	32	L. 13 R. 14	6, 7, 8	5	Hornless.	" "
Juv.	255	32	145	1	37	31	13	5, 6, 7	L. 4 R. 5	Hornless.	" "
♂	440	55	146	1	38	32	12	5, 6	5	Hornless.	" "
♀	435	31	151	1	35	31	L. 15 R. 14	7, 8, 9	5	Hornless.	" "
♀	325	33	148	1	31	30	L. 12 R. 14	5, 6, 7	5	Hornless.	" "
♀	233	28	144	1	38	30	L. 13 R. 12	5, 6, 7	5	Hornless.	" "
♀	723	76	151	1	33	34	14	7, 8, 9	5	Hornless.	" "
♀	528	57	149	1	29	33	L. 12 R. 13	6, 7, 8	5	Horned.	" "
♂	335	41	149	1	40	32	13	5, 6, 7	5	Hornless.	Wádi Halfa.
Juv.	225	29	144	1	40	32	L. 14 R. 13	7, 8, 9, 10	5	Hornless.	" "
♀	486	50	144	1	29	35	12	6, 7, 8	5	Horned.	Suakin.
♀	325	32	147	1	31	32	L. 12 R. 13	5, 6, 7, 8	5	Horned.	"
♀	390	45	143	1	33	35	12	5, 6, 7, 8	L. 4 R. 5	Horned.	"
♂	360	42	142	1	35	35	L. 12 R. 13	6, 7, 8	5	Horned.	"
♂	535	67	140	1	33	30	13	7, 8, 9	5	Horned.	"
♂	514	62	141	1	35	32	L. 12 R. 13	5, 6, 7	5	Hornless.	Ras Gharib, Gulf of Suez.
	517	..	145	1	32	32	12	5, 6, 7	5	Hornless.	" "

In Egyptian specimens there is very little variation in the number of the ventrals, as it only amounts to 9; but in the Hadramut, in Arabia<sup>1</sup>, there are as many as 164 ventrals, although there is no corresponding increase in the number of the subcaudals.

<sup>1</sup> By an oversight this species was not included in my account of the reptiles collected in the Hadramut, on the expedition of the late Mr. Theodore Bent.

The presence or absence of horns does not depend on sex, as has been frequently supposed.

In one of the females from Gizeh and in another from Suakin there is partial division of the anal.

This species is distinguished from *C. vipera* by the scales between the eyes superiorly, around the eyes, between the labials and the eyes, and across the body being more numerous. It has also many more ventrals and subcaudals. A viper from Algeria described by Duméril and Bibron as *Echidna atricauda* is stated to have had 150 ventrals, 35 subcaudals, and 35 rows of scales, numbers which preclude its having been an example of *C. vipera*, as the highest number of ventrals and subcaudals respectively as yet recorded in it are 122 and 26. They had, however, before them specimens presented to the Paris Museum by Doctor Clot Bey, an Egyptian official, which, from the name they selected for the species, were probably *C. vipera*.

The figure of this species as a hieroglyph occurs frequently on the monuments of Egypt. There is no evidence to prove that it was sacred to any god, but Herodotus states that it was found embalmed at Thebes.

## ECHIS.

*Echis*, Merrem, Syst. Amph. 1820, p. 149.

Body moderately long; tail short; head markedly distinct from the neck, covered above and on its sides with imbricate keeled scales; nostril directed upwards and outwards; nasal single or divided; eye moderate, pupil vertical; small scales between the eye and the labials; supraocular narrow, present or absent. Scales 25-37 rows, longitudinal, imbricate, strongly keeled, oblique on the sides, smaller than the dorsal scales, with serrated keels; ventrals not laterally angulate; anal entire; subcaudals single.

## ECHIS CARINATUS, Schneider. (Plate XLIX.)

*Horatta Pam*, Russell, Ind. Serp. i. 1796, pl. ii.

*Pseudoboa carinata*, Schneider, Hist. Amph. ii. 1801, p. 285.

*Boa horatta*, Shaw, Gen. Zool. iii. part 2, 1802, p. 359.

*Scytale bizonatus*, Daud. Rept. v. 1803, p. 339, pl. lxx. fig. 1.

*Vipera (Echis) carinata*, Merr. Syst. Amph. 1820, p. 149.

*Echis ziczac*, Gray, Ann. Philos. new ser. x. 1825, p. 205.

*Echis arenicola*, Boie, Isis, 1827, p. 558; Gray, Zool. Misc. 1842, p. 70; Cat. Snakes B. M. 1849, p. 29; Strauch, Mém. Ac. St. Pétersb. (vii.) xiv. no. 6, 1869, pp. 117, 139; op. cit. (vii.) xxi. no. 4, 1873, p. 228; Bedr. Bull. Soc. Nat. Mosc. liv. 1879, no. 3, p. 50; Boettger, Ber. Senck. nat. Ges. 1880, p. 169; Lortet, Arch. Mus. Hist. Nat. Lyon, iii. 1883, p. 187; Tristram, West. Palest., Rept. & Batr. 1884, p. 147; Blgr. Trans. Linn. Soc. ser. 2, Zool. v. 1889, p. 104.

*Scythale pyramidum*, Is. Geoffr. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 152, pl. vii. fig. 1.

*Vipère*, Audouin, Descr. de l'Égypte, Hist. Nat. i. ? 1829, Suppl. pl. Rept. (1813) iv. figs. 1-14.

*Echis carinata*, Wagler, Syst. Amph. 1830, p. 177; Schinz, Naturgesch. Abbild., Rept. 1833, p. 180, pl. lxxix. fig. 2; Guichenot, Lefebvre's Voy. Abyss., Zool. vi. 1845-50, p. 215, pl. iii.; Rüppell, Mus. Senck. iii. 1845, p. 313; Gray, Cat. Snakes B. M. 1849, p. 29; Dum. & Bibr. vii. 1854, p. 1448, pl. lxxxi. bis, fig. 3; Günther, Cat. Snakes B. M. 1858, p. 268; Rept. Brit. Ind. 1864, p. 397; Jan, Elenco, 1863, p. 122; Filippi, Viagg. in Persia, 1865, p. 357; Theob. Journ. As. Soc. Beng. ex. no. xxxvii. pt. ii. 1868, p. 78; Strauch, Mém. Ac. St. Pétersb. (vii.) xiv. no. 6, 1869, p. 121; Fayrer, Calcutta Med. Gaz., Dec. 1870, p. 241; Anderson, Proc. Zool. Soc. 1871, p. 196; Journ. As. Soc. Beng. xl. pt. ii. 1871, p. 37; Stol. Proc. As. Soc. Beng. 1872, pp. 84, 89; Fayrer, Thanatoph. Ind. 1872, p. 15, pl. xii.; Nicholson, Ind. Snakes, 1874, p. 124, pl. xx. fig. 4; Blanf. East. Persia, Zool. ii. 1876, p. 430; Gasco, Viagg. in Egitto, pt. ii. 1876, p. 120; Theobald, Cat. Rept. Brit. Ind. 1876, p. 218; Ferguson, Rept. Faun. Ceylon, 1877, p. 25; Müller, Verh. naturf. Ges. Basel, vi. 1878, pp. 620, 702; Günth. Proc. Zool. Soc. 1878, p. 978; Bedr. Bull. Soc. Nat. Mosc. liv. 1879, no. 3, p. 50; Blanf. Journ. As. Soc. Beng. xlviii. pt. ii.





*ECHIS CARINATUS.*

♂, Assiut.



1879, p. 116; Blanf. Proc. Zool. Soc. 1881, p. 682; Vaillant, Faun. et Flor. Pays Comalis, 1882, Rept. & Batr. p. 25; Murray, Zool. Sind, 1884, p. 388, pl. xi.; Parenti e Picaglia, Rett. ed Anfibi Mar Rosso, 1886, p. 34; Boettger, Ber. Senck. nat. Ges. 1888-89, p. 305; Matschie, Zool. Jahrb. v. 1890, p. 617; Blgr. Fauna Brit. Ind., Rept. 1890, p. 422, fig.; Peracca, Boll. Mus. Zool. Comp. Anat. Torino, ix. no. 167, 1894, p. 17; Blgr. Trans. Zool. Soc. xiii. 1891, p. 155; Sclater, Snakes Ind. Mus. 1891, p. 69; Anderson, Proc. Zool. Soc. 1895, p. 657; Del Prato, Atti Soc. Ital. Sc. Nat. xxxv. 1895, p. 25; Francaviglia, Boll. Soc. Rom. Stud., Zool. v. 1896, p. 35.

*Echis pavo*, Reuss, Mus. Senck. i. 1834, p. 157.

*Echis varia*, Reuss, Mus. Senck. i. 1834, p. 160, pl. vii. fig. 2.

*Vipera echis*, Schlegel, Phys. Serp. ii. 1837, p. 583, pl. xxi. figs. 10 & 11; in Wagner's Reisen in Algier, iii. 1841, p. 131.

*Echis frenata*, Dum. & Bibr. vii. 1854, p. 1449, pl. lxxxi. bis, figs. 1 & 2; Pfeffer, Jahrb. Hamb. Wiss. Anst. x. 1893, p. 31.

*Coluber gariba*, Seetzen, Reisen Syr., Paläst. &c. 1855, ed. iii. p. 447.

*Toxicoa arenicola*, Günther, Cat. Snakes B. M. 1858, p. 268.

*Vipera carinata*, Jan, Rev. et Mag. Zool. (Guérin) (2) ix. 1859, p. 153; Strauch, Mém. Ac. St. Pétersb. (vii) iv. no. 7, 1862, p. 73.

*Vipera (Echis) superciliosa*, Jan, Rev. et Mag. Zool. (Guérin) (2) ix. 1859, p. 156.

*Echis carinata*, var. *frenata*, Jan, Elenco, 1863, p. 122.

*Echis superciliosa*, Jan, Elenco, 1863, p. 122.

*Echis carinatus*, Blgr. Cat. Snakes B. M. iii. 1896, p. 505; Proc. Zool. Soc. 1896, p. 217; Anderson, Herpet. Arabia & Egypt, 1896, pp. 55 & 110; Blgr. Ann. Mus. Civ. Genova, xvii. (xxxvii.) 1896-97, p. 280.

1 ♂ and 1 ♀. Mokattam Hills, Cairo. Dr. Walter Innes.

1 ♀. Assiut.

1 ♂ and 1 ♀. Suakin. Colonel Sir Charles Holled Smith, C.B., K.C.M.G.

1 ♀. Suakin. Surgeon-Captain R. H. Penton, D.S.O.

2 ♂, 2 ♀, and 5 juv. Suakin.

1 ♂ and 1 ♀. Durrur.

1 ♀. Oasis of Siwah. A. R. Birdwood, Esq.

Snout short, broad and rounded, its length less than the anterior interorbital breadth; rostral very much broader than high; nasal generally divided, in contact with rostral and first labial, and usually a small supranasal, separated from the second labial by a single scale; a supraocular sometimes present; eyes separated above by from 10 to 15 scales; 11 to 20 scales around the eye, and two or three scales between it and the upper labials; 10 to 12 upper labials, exceptionally 9 or 13. One pair of chin-shields in contact with three or four labials, followed by two to five pairs either of small square shields or scales. 25 to 37 rows of scales across the body; 132-195 ventrals; anal 1; subcaudals 23-48. The upper surface generally dark brown or some tint of brown, with 36 to 40 irregular whitish, yellowish, or greyish-yellow transverse bands of varying breadth, more or less dilated in the mesial line, and uniting with one another on the sides, thus defining off a lateral line of more or less triangular dark brown areas,

each alternate with the dark brown areas of the back; the front line of dorsal scales more or less spotted with black; head generally brown, with a varying number of yellowish or greyish-yellow bands, reducing the brown colour to a well-defined, almost black band behind the eye, a spot below the eye, and to a few irregular bands, lines, or spots on the upper surface of the head, sometimes assuming the form of cruciform markings. Under surface white, with some black spots on the angles of the ventrals and some indistinct spots on the mesial line; on the subcaudals the spots tend to arrange themselves as a median longitudinal band or line.

The foregoing is the general colour of this viper in Egypt, but in India the dark brown of the upper surface is frequently lost, and of the pale transverse bands only the mesial dorsal dilatation remains as a white spot with a dark margin, while their lateral portions assume more or less the character of ocelli.

It attains to 830 millim. in length, of which the tail forms 184 millim.

It is not common in the neighbourhood of Cairo (Mokattam Hills and around the Pyramids of Gizeh). It is especially abundant at Suakin and Durrur. It is found in Abyssinia, Somaliland, Nubia, and as far south as Lake Stephanie, and ranges westwards to Togoland, and is in all likelihood spread all over Africa north of the Equator. In Asia it is present in Arabia and Southern Palestine to Transcaspia, and eastwards to Singbhum, in Bengal, and southwards in India to the Carnatic.

It is not confined to arid or semi-arid plains and rocky hillsides, but it is common on the sandy, grassy, and acacia-studded plains of Suakin and Durrur, and in India<sup>1</sup> it is met with on sandy but forest-land in the Godaveri valley. It is generally found under stones. It is nocturnal in its habits, and, according to Dr. Günther, *Scolopendæ* form part of its food, as he has removed their remains from its stomach. Dr. Stoliczka says that it feeds almost exclusively on insects.

It is known to the natives of Egypt as *أورع* = *ghariba*.

<sup>1</sup> Some startling statistics regarding the profusion in which this species is alleged to occur in the Ratnagiri district in the Konkan, on the east coast of India to the south of the city of Bombay, have been published by Mr. G. W. Vidal, C.S. (Journ. Bombay Nat. Hist. Soc. v. 1890, pp. 64-71). He says "it may be safely concluded that of the whole number of snakes annually destroyed throughout British India," and which for 1885 and 1886 he puts down at 420,044 and 417,596 respectively, "considerably more than one-half, consisting almost exclusively of individuals of the *Echis* species, are killed at Ratnagiri alone!" (the sign of exclamation is Mr. Vidal's and is very appropriate and significant). Taking the number of snakes destroyed in the Ratnagiri district in a period of six years at Mr. Vidal's annual average of 225,721, and dividing this by 365, for the days of the year, we are to understand from Mr. Vidal's statistics that more than 618 vipers were daily destroyed in his district. When the price for each *Echis carinatus* was tentatively raised by the Government, in 1862, to two annas a specimen, we are told that 115,921 were "killed and brought in for rewards in Ratnagiri within eight days (December 2nd to 10th)!" The only rational explanation of these statistics is that a mistake occurred somewhere. Unless every snake was effectually destroyed when it was paid for, the mounting up of the numbers captured and submitted for payment could be easily accounted for.



Sir J. Fayrer—whose experiments, on the influence of snake-poison on animals, brought him in contact with nearly all the poisonous snakes of India—describes this viper as naturally sluggish until roused, when it immediately places itself in a position of offence and defence, becomes very irascible and active, rapidly moves the coils of its body on one another, producing the loud rustling so characteristic of it and *Cerastes*, and darts on its prey a considerable distance—a foot or more—striking with great fierceness and unerring aim.

The venom of this viper, according to the same authority, destroys life rapidly in small mammals and birds, but as the snake is of small size it is perhaps less likely to be fatal to man. The deadly effect, however, of its poison on pigeons, fowls and dogs led him to regard it with peculiar dread. A few cases have been recorded of human beings succumbing to the poison of this viper; but when the evidence adduced in support of them is investigated, I think, it can be said with all truth that no alleged instance of death resulting in man from the venom of *E. carinatus* has been supported by evidence in which no flaw can be detected. There can be no doubt, however, that in India, where this species is so common, it has the popular reputation of being a snake deadly to man.

After the foregoing was in type, I thought it as well to have the opinion of my friend Dr. D. D. Cunningham on this matter. He at once acceded to my request; and I am consequently indebted to him for the following note:—

“I am sorry to say that I can give you very little information regarding the poison of *Echis carinatus*. I had very great difficulty in procuring live specimens, and those which I did get hold of were consequently too valuable to allow of my taking venom from them, more especially as the quantity of venom to be obtained from any individual is so small that, in order to procure an efficient standardized working stock, one would have had to have employed a very large number of specimens.

“The only experiments, therefore, which I tried were conducted by causing the snakes to bite fowls and other small animals, and the results merely served to demonstrate that the poison produced effects parallel to those produced by *Daboia*-venom, and consequently quite distinct ones from those caused by *Cobra*-venom.

“The symptoms, as in the case of *Daboia*-intoxication, are primarily those of acute nervous irritation, which, where the dose of venom is relatively a large one, culminate in acute general convulsions and death within 10 minutes at utmost. Where a fatal result does not occur, the irritation is followed by profound nervous exhaustion, and this may either be succeeded by recovery or by the incidence of what appears to be of the nature of general septicæmia accompanied by a tendency to the occurrence of diffuse hæmorrhages.

“Where the dose of venom is too small to occasion general convulsions, or where a dose, large enough to cause the latter when administered in concentrated form, is diluted beyond a certain limit, the only symptoms present are, as a rule, those of local nervous irritation at the site of the introduction of the poison.

“Cumulative introduction of small doses never leads to the development of general convulsions, but, if pushed far enough, induces the induction of the septicæmic condition.

“I never heard of a case of *Echis*-bite giving rise to acute general convulsions in the human subject, and I do not believe that the amount of venom yielded by the bite of any specimen of *Echis* can ever be large enough to produce such a result.



*Measurements &c. of E. carinatus, Schneider (in millim.).*

Total length.	Tail.	Ventrals.	Subcaudals.	Scales.	Nasals.	Nasals and supranasals.	Scales round eye.	Upper labials.	Locality.
308	24	149	23	29	2	C. R. <sup>1</sup>	11—11	L. 10, R. 11	Anamalai Mountains.
340	30	158	26	27	2	"	13—13	10—11	" "
295	35	141	28	29	2	"	13—13	10—10	Madras.
243	25	132	25	27	2	"	15—15	9—9	Dekhan.
270	22	137	25	27	2	"	L. 15, R. 13	9—9	"
146	15	139	25	27	2	"	14—14	10—9	"
425	42	145	28	25	2	"	12—12	10—11	"
550	50	171	31	31	2	"	16—16	12—12	"
280	26	153	28	31	2	"	18—20	12—11	Mahabaleshwar.
240	25	155	31	31	2	"	16—17	10—11	"
185	17	163	28	33	2	"	16—18	11—12	"
481	48	179	34	33	2	"	16—16	12—13	Disa.
325	37	163	31	33	2	"	15—16	10—12	Karachi.
395	37	168	31	31	2	"	..	..	"
265	15	173	28	31	2	"	15—17	11—11	Sind.
620	54	184	31	35	1	"	19—19	12—12	"
681	60	184	31	35	2	"	18—19	11—11	"
390	40	174	32	30	2	"	14—17	11—11	W. of Bampur, Baluchistan.
579	50	192	30	35	2	"	18—18	13—13	" "
427	43	173	34	37	2	"	19—19	11—12	{ Between Nushki and the Helmand.
406	41	174	37	35	2	"	17—17	12—11	Chilgez, Afghanistan.
408	38	185	33	35	2	"	15—16	12—12	Askabad.
..	..	178	35	33	..	"	..	..	Ak-Tjube ( <i>Strauch</i> ).
..	..	184	32	32	..	"	..	..	" "

<sup>1</sup> In contact with rostral.

*Measurements &c. (continued).*

Total length.	Tail.	Ventrals.	Sub-caudals.	Scales.	Nasals.	Nasals and supra-nasals.	Scales round eye.	Upper labials.	Locality.
	..	178	32	34	..	C. R.	..	..	Krasnovodsk ( <i>Strauch</i> ).
	..	184	34	34	..	"	..	..	" "
	..	187	31	33	..	"	..	..	" "
360	37	173	37	37	2	"	17-17	11-11	Seistan, Persia.
530	46	182	32	37	2	"	17-17	11-11	Nasirabad, Seistan, Persia.
405	39	177	35	35	1	"	18-16	12-11	Jask, S. Persia.
410	41	178	33	31	1	"	15-16	10-10	" "
350	34	180	34	31	1	"	17-17	11-11	" "
310	22	189	28	33	1	"	19-20	12-11	" "
288	28	175	35	31	2	"	17-17	11-11	" "
345	28	187	32	33	2	"	15-16	11-12	" "
415	40	170	30	35	2	"	18-18	11-11	Bushire, Persia.
310	30	172	34	34	2	"	18-18	11-12	" "
	..	172	30	31	2	"	16-18	11-13	" "
385	35	180	31	34	2	"	15-15	11-12	" "
370	43	162	30	32	1	"	18-18	11-12	Maskat.
506	84	165	30	31	1	"	18-18	12-11	"
350	42	165	32	31	1	"	17-17	10-10	"
420	43	166	32	32	1	"	18-18	12-10	"
485	65?	184	48	27	2	"	15-15	9-10	Hadramut.
495	51	159	31	29	2	"	17-17	10-10	Aden.
412	55	172	43	25	2	"	16-16	10-11	Suakin.
161	18	174	41	28	2	"	17-17	11-12	"
550	66	177	40	30	2	"	15-15	10-11	"
535	58	180	43	29	2	"	18-18	11-12	"
163	19	183	42	27	2	"	17-17	11-12	"

*Measurements &c. (continued).*

Total length.	Tail.	Ventrals.	Sub-caudals.	Scales.	Nasals.	Nasals and supra-nasals.	Scales round eye.	Upper labials.	Locality.
830	90	184	38	30	2	C. R.	15—16	11—13	Suakin.
166	14	185	30	30	2	"	15—15	11—12	"
700	68	186	36	30	2	"	18—17	12—11	"
180	18	187	36	31	2	"	20—19	12—12	"
163	16	188	38	28	2	"	18—19	10—11	"
697	80	189	38	33	2	"	20—19	12—12	"
525	51	191	33	31	2	"	15—15	11—11	"
402	46	173	41	27	2	"	16—18	11—11	Durrur.
555	57	179	35	30	2	"	16—17	11—11	"
411	39	195	36	28	2	"	18—19	13—12	"
610	58	184	34	29	2	"	14—17	12—11	Assiut.
222	22	167	36	30	2	"	16—19	11—13	Mokattam Hills.
210	21	172	37	29	2	"	17—15	11—13	" "
	..	167	37	27	..	"	....	....	Egypt ( <i>Strauch</i> ).
445	..	168	..	28	1	"	17—18	11—11	"
305	27	168	30?	28	2	"	16—17	12—11	"
	..	168	36	28	..	"	....	....	" ( <i>Strauch</i> ).
	..	173	38	28	..	"	....	....	" "
573	65	173	37	28	2	"	18—18	12—12	"
	..	177	33	30	..	"	....	....	" ( <i>Strauch</i> ).
	..	182	31	28	..	"	....	....	" "
	..	183	31	31	..	"	....	....	" "
496	59	168	39	28	2	"	17—18	11—12	Barbary.
397	43.	145	29	29	2	"	13—13	10—10	West Africa.
486	50	148	26	31	2	"	14—14	10—10	" "

"The doubtful question is in regard to the possibility of the induction of chronic septicæmic intoxication. In Northern India there is a generally diffused belief that such intoxication is liable to occur; and Alcock<sup>1</sup> assured me that he once met with a case in which it unequivocally was present. On the other hand, however, Elliot<sup>2</sup>, who tried many experiments in Madras, affirms that he found that coolies, whilst full of fear of the bite of Daboias, had no dread whatever of *Echis*-bites, and were quite willing to allow themselves to be bitten as a matter of experiment.

"My own belief is that there are only two kinds of snake-venom—a colubrine and a viperine one,—and that any differences in the phenomena attending the bites of different species of colubrine and viperine snakes are simply determined by differences in the amount of toxic material present, the amount being dependent partly on the bulk of venom available and partly on the ratio of toxic material to bulk; *e.g.*, the common krait has a large quantity of very potent venom to dispose of, the banded krait has a relatively small quantity of feeble material.

"I am sorry that I cannot give you more definite information, and I doubt much whether you will be able to get any of a really trustworthy nature."

The following is an analysis of the table (pp. 340–342):—

Range of ventrals.	Range of subcaudals.	Locality.
132–171	23–31	S. India.
163–184	28–34	N.W. India.
173–192	30–37	Baluchistan to Transcaspia.
172–189	28–37	Persia.
159–184	30–48	S.E. Arabia.
172–195	30–43	Suakin, &c.
167–184	31–37	Egypt.
145–168	26–39	W. Africa.

As a rule, two enlarged scales or, more properly, small plates are present behind the rostral, and thus separate the nasals, but not unfrequently they become broken up. The nasals throughout the series vary from one to two, but two is the prevalent number—*i.e.*, complete division of the nasal shield generally takes place. In some cases a small scale occurs close to the nostril, which is perforated in a single shield; and in other instances a scale of this kind becomes united to the nasal and defines part of the nostril, while in others as many as two such scales are present. In some instances there is union of the nasal and first labial. The chin-shields are succeeded by a variable number of scales or plates in pairs.

In the type of *Echis coloratus*, Gthr., from Arabia, the nasal and supranasals are excluded from the rostral by three small scales; the upper labials are 13; there are 17 to 19 scales around the eye; there are 32 scales around the body; 207 ventrals and 47 caudals. Two specimens from the Dead Sea, three from Maskat, three from the Hadramut, and one from Socotra present the general features of the type of *E. coloratus*;

<sup>1</sup> Indian Med. Gazette, xxiii. 1889, p. 175.

<sup>2</sup> Indian Med. Record, ix. 1895, p. 207.

but in one from the first-mentioned locality the so-called supranasal is in contact with the rostral, but the nasal is excluded by two small scales, and in one from Maskat the nasal is broadly in contact with the rostral as in *E. carinatus*. In *E. coloratus*, as in the latter species, the arrangement of the plates defining the rostral is very varied. In some the single nasal is partially divided by three imperfect sutures, and the supranasal occasionally divides, or may be amalgamated with, the scales that usually separate it from the rostral. The supraocular is absent in vipers referred to *E. coloratus*, but it is sometimes much reduced in size in *E. carinatus*, or is even entirely absent. The differences that exist between *E. coloratus* and *E. carinatus* are so trifling that they do not appear to merit more than variety rank.



THE  
BATRACHIANS OF EGYPT.

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BATRACHIA ECAUDATA.

Suborder PHANEROGLOSSA.

Series A. FIRMISTERNIA.

RANIDÆ.

RANA.

*Rana*, Linn. Syst. Nat. i. 1766, p. 354; Blgr. Cat. Batr. Sal. B. M. 1882, p. 6.

Tongue free, deeply emarginate posteriorly; vomerine teeth present. Pupil horizontal; tympanum distinct or hidden by the skin; glandular folds present or absent; fingers free; toes more or less webbed, tips simple or dilated; external metatarsi webbed to the base; terminal phalanges elongate, acute, with or without transverse dilatations; omosternum and sternum with a long bony style.

RANA ESCULENTA, Linn.

*Rana esculenta*, Linn. Syst. Nat. i. 1766, p. 357; Müller, Verh. nat. Ges. Basel, vii. 1882, p. 129.

Vomerine teeth in two nearly transverse rows between the choanæ; snout variable, more or less triangular or rounded; tympanum distinct, nearly as large as the eye; upper eyelid broader than the space between the eyes; skin smooth or with small warts; a well-developed lateral glandular fold, with additional short narrow glandular folds in some; hind limbs moderately long, variable, the tibio-tarsal joint reaching to near the snout; tibia as long as, or even considerably shorter than, the foot measured from the outer metatarsal tubercle; fingers moderately long, the first slightly longer than the second; toes broadly webbed; subarticular tubercles of digits well developed; outer metatarsal tubercle small, occasionally very feebly developed; inner metatarsal tubercle very variable, small or prominent, blunt or strongly compressed, shovel-shaped.

General colour varying from bright green, blue, or olive to uniform brown; spotted or marbled with olive-brown or blackish, sometimes forming longitudinal bands on the back; usually three pale dorsal stripes; limbs spotted or barred with olive-brown or blackish, the hinder sides of the thighs marbled with blackish, sometimes with bright yellow or orange; occasionally a pale line along the inside of the tibia near the upper surface; vocal sacs coloured grey to white.

Mr. Boulenger, who has so largely contributed to our knowledge of the races of this species of frog, recognizes four, viz. *ridibunda*<sup>1</sup>, *typica*, *lessona*, and *nigromaculata*. The first-mentioned variety, to which the frogs of North Africa are referable<sup>2</sup>, is distinguished from the typical form by the smaller size of its inner metatarsal tubercle, and by its proportionally longer tibiae, this latter character sufficing to separate it from all the other races. It has generally a green vertebral line. It attains to a great size in Germany, females from snout to vent measuring 104 mm., and males 98 mm.; but the Algerian frogs are not much smaller, as in the British Museum there is a female from Biskra 96 mm. in length.

It is distributed over Europe (with the exception of North-western and Central Italy), Western Asia as far east as Eastern Turkestan, Afghanistan, and Baluchistan, and over Northern Africa from Egypt to the coast of Morocco (Casa Blanca), and extends to the island of Madeira. In the Algerian region it is found in the Sahara as far south as Wargla.

Hitherto only one specimen has been recorded from Egypt. It was mentioned by F. Müller so long ago as 1882<sup>3</sup>, but I am indebted to Mr. Boulenger for the information that the British Museum lately came into the possession of one individual obtained at Alexandria by the late M. Letourneux. It is a small male, 56 mm. from snout to vent. The snout is rather broadly rounded, compared with some specimens from Algeria. It is of a brownish-olive colour, and the dark spots are rather obscure.

RANA MASCARENIENSIS, Dum. & Bibr. (Plate L. fig. 1.)

*Grenouille verte*, var., Audouin, Descr. de l'Égypte, Hist. Nat. i. ? 1829, p. 182, Suppl. Rept. pl. ii. figs. 11 1-11 3.

*Grenouille verte*, var. à dos blanc, Audouin, op. cit. p. 182, pl. ii. figs. 12 1 & 12 2.

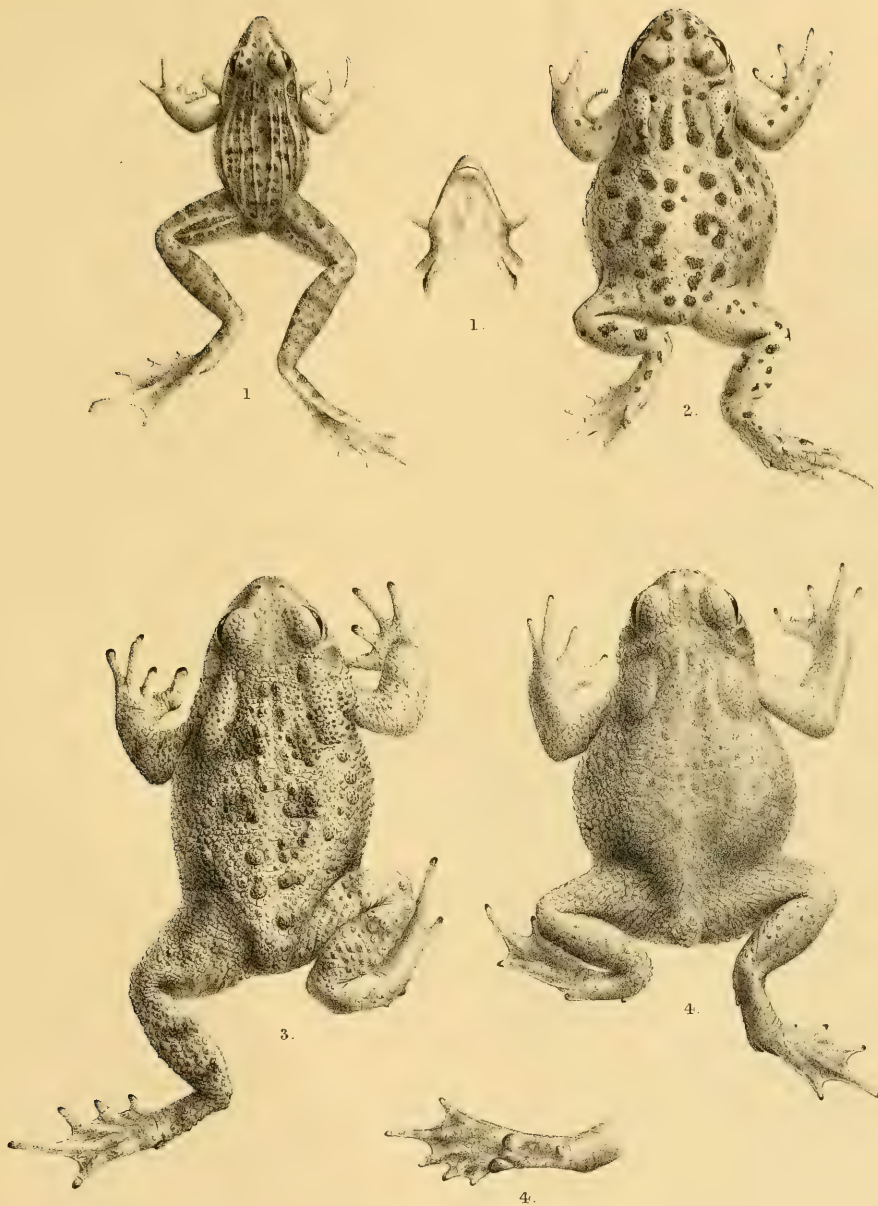
*Rana esculenta*, var., Linn., Audouin, op. cit. p. 182.

*Rana mascareniensis*, Dum. & Bibr. viii. 1841, p. 350; Bell, Zool. Beagle, Rept. 1843, p. 32, pl. vi. fig. 2; Günther, Cat. Batr. Sal. B. M. 1858, p. 18; Peters, Mon. Berl. Ak. 1866, p. 891;

<sup>1</sup> *Rana ridibunda*, Pallas, Reise, i. 1771, p. 458; Blgr. Proc. Zool. Soc. 1885, p. 666, pl. xl.

<sup>2</sup> Proc. Zool. Soc. 1891, p. 374; *conf.* Bedriaga, Bull. Soc. Mosc. 1889, p. 242, who recognized five races, as he considered the Spanish-North-African frogs to merit subspecific rank.

<sup>3</sup> Verh. nat. Ges. Basel, vii. 1882, p. 129.



H. Grönvold del. et lith.

*RANA MASCARENIENSIS*. Fig. 1 ♂, Nile overflow, Gizch.

*BUFO VIRIDIS*. Fig. 2 ♀, Ramleh, Alexandria.

*BUFO REGULARIS*. Fig. 3 ♂, Assuan.

*BUFO PENTONI*. Fig. 4 ♀, Shaata Gardens, Suakin.



Lataste, Bull. Soc. Zool. France, 1879, p. 91; Boulenger, id. op. cit. p. 92; Peters, Sitzb. Ges. naturf. Fr. Berl. 1881, p. 162; Blgr. Cat. Batr. Sal. B. M. 1882, p. 52 & p. 460; Müller, Verh. nat. Ges. Basel, vii. 1882, p. 130; et op. cit. 1884, p. 275 et p. 670; et id. op. 1884, viii. p. 253; Günther, Proc. Zool. Soc. 1888, p. 51; Héron-Royer & Van Bambeke, Arch. Biol. p. 252, pl. xvi. figs. 1-3; Boettger, Cat. Batr. Mus. Senck. 1890, p. 10; Pfeffer, Jahrb. Hamb. Wissen. Anst. x. 1893, p. 22; Günther, Proc. Zool. Soc. 1894, p. 88; Bocage, Herpét. d'Angola et du Congo, 1895, p. 160; Blgr. Ann. Mus. Civ. Genova, (2) xv. (xxxv.) 1895, p. 16; Proc. Zool. Soc. 1895, p. 539; Günther, Ann. Mag. N. H. (6) xv. 1895, p. 526; Blgr. Ann. Mus. Civ. Genova, (2) xvi. (xxxvi.) 1896, p. 554; Anderson, Herpet. Arabia & Egypt, 1896, p. 110; Bocage, Journ. Sc. Nat. Ac. Sc. Lisb. (2) iv. no. 14, 1896, pp. 80, 96; Blgr. Proc. Zool. Soc. 1896, p. 217; Ann. Mus. Civ. Genova, (2) xvii. (xxxvii.) 1897, pp. 14, 22, 280; Proc. Zool. Soc. 1897, p. 801; Tornier, Kriechth. Deutsch-Ost-Afr. 1897, p. 92.

*Rana bibronii*, Hallowell, Proc. Ac. Philad. 1845, p. 249; Günther, Cat. Batr. Sal. B. M. 1858, p. 18; Peters, Mon. Berl. Ak. 1863, p. 78.

*Rana fuscigula*, var. (*non* Dum. & Bibr.), Rüppell, *part.*, Mus. Senck. iii. 1845, p. 314.

*Rana mossambica*, Peters, Bericht Berl. Ak. 1854, p. 626.

*Rana nilotica*, Seetzen, Reise durch Syrien, Paläst., Aegypt. &c. 1855, iii. p. 490; Peters, Mon. Berl. Ak. 1863, p. 78; id. op. 1866, p. 891; Sitzb. Ges. naturf. Fr. Berl. 1881, p. 162.

*Rana savignyi*, Jan, Cenni Mus. Civ. Milano, 1857, p. 52.

*Rana superciliaris*, Günther, Cat. Batr. Sal. B. M. 1858, pp. 17 & 132, pl. i. fig. B.

*Rana idæ*, Steind. Verh. zool.-bot. Ges. Wien, 1864, p. 266, pl. 12. fig. 1.

*Rana nigrescens*, Steind. op. cit. p. 268, pl. 12. fig. 2.

*Rana nichieta*, Bocage, Proc. Zool. Soc. 1867, p. 843; Peters, Sitzb. Ges. naturf. Fr. Berl. 1881, p. 162.

*Rana porosissima*, Steindach.<sup>1</sup> Novara Amph. 1867, p. 18, pl. i. fig. 9.

*Rana subpunctata*, Bocage, Journ. Sc. Lisboa, 1868, i. p. 73; Herp. d'Angola et du Congo, 1895, p. 161.

*Rana abyssinica*, Peter, Sitzb. Ges. naturf. Fr. Berl. 1881, p. 163.

*Rana esculenta*, *part.*, Müller, Verh. nat. Ges. Basel, vii. 1882, p. 129.

*Rana mascareniensis* et var. *idæ*, Müller, Ver. nat. Ges. Basel, vii. 1882, p. 130.

*Rana marchii*, Rochebrune, Bull. Soc. Philom. (7) ix. 1885, p. 90.

5 ♂ and 5 ♀. Fields below Gizeh Pyramids.

2 ♂ and 1 ♀. Mahallet el Kebir. George Kent, Esq.

4 ♂ and 1 ♀. Freshwater Canal, Suez.

Vomerine teeth internal to the inner and anterior border of the choanæ and in a narrow somewhat oblique line; snout pointed, rather short, its length very variable, usually equal to the interval between the eyes anteriorly; nostril nearer to the extremity of the snout than to the eye; tympanum nearly as large as the eye. First finger shorter than the second; fifth toe longer than the third or subequal; toes about two-thirds webbed; a small tubercle at the base of the first toe; hind limbs very variable in length; the tibio-tarsal joint, when the limb is laid forwards, reaches either to or

<sup>1</sup> *Conf.* Bocage, Journ. Sc. Lisboa, xi. 1887, p. 191.



beyond the tip of the snout or halfway between the latter and the eye ; openings of the vocal sacs either parallel to the lower jaw or placed slightly obliquely, the posterior extremity of the orifice lying immediately below the angle of the lower jaw. Upper surface of body with glandular folds, one on each side, from behind the eye to the groin, and six other folds between them either interrupted or continuous ; a strong glandular fold from the eye and tympanum to the shoulder.

General colour greyish olive or brownish olive above, with dark spots on the back, which has occasionally a pale vertebral stripe, and with dark spots and bars on the limbs ; generally a pale line along the back of the thigh margined with black ; throat and chest more or less dusky or livid, the remainder of the under surface pure white.

♂ .	Snout to vent	41 mm.,	vent to tip of fourth toe	74 mm.,	eye to snout	7.6 mm.
♀ .	„	47.7 „	„	„	82 „	„ 8 „

This and the previous species are the only representatives of the genus in Lower Egypt<sup>1</sup>. It is very common in the backwaters and canals and is found throughout the entire valley of the Nile, but it is not present at Suakin. It occurs in suitable localities, as a rule, throughout the entire continent<sup>2</sup>.

It is known to the natives as ضفدع الماء, *dofdah el moia*, or water-frog, in contradistinction to the toads ; but according to Seetzen<sup>3</sup> it is known in Egypt as *el backrur*.

An adolescent frog in the British Museum from the Isle of France has the snout very much the same as in the frogs from Egypt, possesses similarly proportioned limbs and digits, glandular folds of a like character, and the orifices of the vocal sacs running parallel to the lower jaw as in the Nilotic frogs. Its colour also is much the same as in the Egyptian frogs, and, as in some of them, there is a pale vertebral line. Two young frogs from Madagascar, in the same collection, resemble the frogs from Gizeh and Mahallet el Kebîr in the details of their structure and coloration, while four others from the same island resemble the frogs from Alexandria in having a white vertebral line. Three specimens from Nossi Bé, and two others from Ankafana in Madagascar, present the two types of coloration found in Egypt and are in no way separable specifically from the Egyptian frogs.

A male and female from Taita, East Africa, have also all the structural characters of

<sup>1</sup> Dr. Steindachner has recorded (Reise Freg. Novara, Amphibien, 1867, p. 8) a species of *Rana* from Kordofan, viz. *Pyxicephalus cordofanus*=*R. cordofana*, but from what part of the province has not been stated. It is allied to the Southern and Eastern African *R. delalandii*.

Peters in his account of the Reptiles and Batrachians collected by (the late) Baron von Barnim and by Dr. R. Hartmann on their expedition to the Sennaar district recorded the occurrence there of another genus of the family *Ranidae*, viz. *Casina*, and considered the species to be *C. senegalensis*, Dum. & Bibr. ; but it may possibly prove to be the form found in Shoa and Somaliland, viz. *C. obscura*, Blgr. (Proc. Zool. Soc. 1895, p. 644, pl. xxxix. fig. 3).

<sup>2</sup> Héron-Royer and Van Bambeke, in their communication on the buccal apparatus of the tadpoles of certain species of frogs and toads, quoted in the foregoing and following synonymy, give a list of the species they describe, and by an unfortunate oversight characterize all of them as European. The list includes *Rana mascareniensis*, *Bufo regularis*, and *Bufo pantherinus*, not one of which is European.

<sup>3</sup> *Op. cit.* iii. p. 490.

*R. mascareniensis*, but with this exception, that the orifices of the vocal sacs which in frogs from Egypt and Madagascar run parallel to the lower jaw are in them placed obliquely to it, being directed downwards and backwards to below the shoulder. Frogs presenting this type of vocal sac are found in Abyssinia, Wadelai, Lamu, north of Zanzibar, in the Gaboon District, and in Sierra Leone. All of them have the fifth toe longer than the third, as in Egyptian specimens. The British Museum possesses two frogs from Angola with the orifices of the vocal sacs oblique. One of them has the fifth toe longer than the third, whereas the other has these proportions reversed, and yet they seem to be specifically identical. Their hind limbs are somewhat longer than in the frogs from Egypt, Madagascar, and other parts of Africa referable to this species, but it is only a question of degree.

The slight difference in the way in which the vocal sac opens in relation to the ramus of the lower jaw, *i. e.* whether it is straight or oblique in position, cannot well be regarded as more than an illustrative variation when all the other features of these frogs are duly considered.

Frogs with the vocal sacs opening in a straight line are met with in Egypt, the Isle of France, and Madagascar, while those with them more or less oblique occur in Abyssinia, the Upper Nile (Wadelai), East Africa, West Africa, and Angola.

In the two series the fifth toe is longer than the third, or the two are equal, or this proportion may even be reversed, so great is variation in this detail.

Professor Peters held a distinctly opposite view to that here expressed, as he not only regarded the Nilotic frog as a good species, but he also upheld the specific distinctness of *R. mossambica*, Peters, *R. bibroni*, Hallow., and *R. porosissima*, Steindach., and went even further and described the Abyssinian frogs as representing a valid species.

The frog-headed deity *Batrachcephalus* or *Ka* was a form of Ptah, the Lord of Truth, particularly in relation to the creation of man. There was also a frog-headed goddess Heqa, the wife of Nun or Khnum, the male and female principle of water, and the celestial water or abyss.

According to Horapollo a frog was emblematical of renewed birth. It appears as a symbol to form the base of the palm-branch of years held by Thoth, as the deity who presided over the life of man. At Thebes it was sacred to the goddess Heqa. The figure of a tadpole occurs as a hieroglyph. Besides its proper meaning (*hfn*) tadpole, it had the transferred signification hundred thousand. From the fact that frogs were embalmed at Thebes it is evident that some peculiar belief was attached to them.

The Engystomatidæ are represented in Kordofan by the genus *Hemisus* (Günther, Cat. Batr. Sal. B. M. 1858, p. 47) and by a species which Dr. Steindachner named (Sitz. Ak. Wien, xlviii. Abth. i. 1863, p. 191, pl. i. figs. 10-13) *Kakophrynus sudanensis* and (Verh. zool.-bot. Ges. Wien, xiv. 1864, p. 284) *Hemisus sudanense*. An example of this species is preserved in the British Museum, and another in the Vienna Museum. The former was obtained in Kordofan, and the latter in the Sudan, but in what part of it is seemingly unknown.

## Series B. A R C I F E R A.

## BUFONIDÆ.

## BUFO.

*Bufo*, Laurenti, Syn. Rept. 1768, p. 25, *part.*; Blgr. Cat. Batr. Sal. B. M. 1882, p. 281.

Tongue free, entire, not retractile posteriorly; no vomerine teeth; pupil horizontal; tympanum distinct or hidden by the skin, rarely absent; parotoids present or absent; head with or without bony ridges; skin generally more or less warty; fingers free; toes more or less webbed, with simple or slightly dilated tips; external metatarsi not separated by a web; omosternum generally absent; sternum either cartilaginous or with a fibro-cartilaginous or nearly bony style; diapophyses of sacral vertebra more or less dilated; coccyx attached by two condyles.

(*Toads without cranial ridges.*)

## BUFO VIRIDIS, Laur. (Plate L. fig. 2.)

*Bufo viridis*, Laur. Syn. Rept. 1768, p. 27 et p. 111, pl. i. fig. 1; Sparrmann, Vetensk. Ak. Hand. Stockh. xvi. 1795, p. 183, pl. vii.; Schn. Hist. Amph. i. 1799, p. 200; Latr. Hist. Rept. ii. 1800, p. 115; Hist. Salam. de France, 1800, p. xli; Daud. Hist. Rain. 1802, p. 79, pl. 28. fig. 2; Daud. Hist. Rept. viii. 1803, p. 156; Licht. Doubl. Berl. Mus. 1823, p. 106; Bibron & Bory de St. Vincent, Expéd. Sc. Morée, Zool. Rept. &c. iii. 1<sup>re</sup> pt. 1833, p. 75, pl. xv. 3<sup>e</sup> sér. fig. 2 ♂ & fig. 3 ♀; Génée, Mem. R. Ac. Sc. Torino, ser. 2, i. 1839, p. 280; Bonap. Icon. Fauna Ital. ii. 1838, pl. fig. 1; *part.*, Dum. & Bibr. viii. 1841, p. 681; Guichen., Lefebvre, Voy. Alger, v. 1850, p. 27; Günther, Cat. Batr. Sal. 1858, p. 58; Proc. Zool. Soc. 1859, p. 470; Strauch, Mém. Ac. St. Pétersb. (vii.) iv. no. 7, 1862, p. 79; Steind. Unger & Kotschy's Insel Cyprien, 1865, p. 572; Steind. Novara Amph. 1867, p. 39; Carruccio, Atti Soc. Ital. Sc. Nat. xii. 1869, p. 567; Collin, Natur. Tids. (3) vi. 1869, p. 336; Westph.-Castelnau, Cat. Rept. 1869, p. 54; Stoliczka, Journ. As. Soc. Beng. xxxix. pt. ii. 1870, p. 155; Anderson, Journ. As. Soc. Beng. xl. pt. ii. 1871, p. 38; Proc. Zool. Soc. 1872, p. 402; Fatio, Vert. Suisse, Rept. et Batr. iii. 1872, p. 411; Koch, Ber. Senck. Ges. 1872, p. 170; Stoliczka, Proc. As. Soc. Beng. 1872, p. 113; De Betta, Faun. Ital., Rett. Anf. pt. iv. 1874, p. 74; Blanford, East. Persia, ii. (Zool.) 1876, p. 434; Lessona, Atti Ac. Linc. Mem. Cl. Sc. Fis. i. 1877, p. 1085, pl. 4; Blanf. Second Yarkand Miss., Rept. & Batr. 1878, p. 26; Blgr. Proc. Zool. Soc. 1880, p. 553, pl. L.; Blgr. Cat. Batr. Sal. B. M. 1882, p. 297; Müller, Verh. naturf. Ges. Basel, vii. 1882, p. 137; Camerano, Mem. Ac. Torino, (2) xxxv. 1884, p. 229; Compt. Rend. Assoc. Fr. x. 1882, p. 690; Boettger, Abhand. Senck. Ges. xiii. 1884, p. 133;

- Camerano, Proc. Zool. Soc. 1884, p. 424; Héron-Royer, Bull. Soc. Zool. Fr. ix. 1884, p. 29; Müller, Verh. naturf. Ges. Basel, vii. 1884, p. 122 et p. 278; Murray, Ann. Mag. N. H. (5) xiv. 1884, p. 105; Tristram, West. Palestine, Rept. & Batr. 1884, p. 159; Müller, Verh. naturf. Ges. Basel, viii. 1887, p. 258; Boettger, Radde's Fauna u. Flora des südwestl. Casp. 1886, p. 79; Bedr. Bull. Soc. Zool. Fr. xiii. 1888, p. 220; Blanchard, Bull. Soc. Zool. France, xiii. 1888, p. 67; Boettger, Sitzb. Ak. Wissensch. Berl. 1888, p. 148; Ber. Senck. Ges. 1888-89, pp. 268, 274; Blgr. Ann. Mag. N. H. (6) ii. 1888, p. 506; Héron-Royer, Bull. Soc. Zool. Fr. xiii. 1888, p. 27, figs., & p. 84; Walter, Zool. Jahrb. iii. 1888, p. 983; Blgr. Trans. Linn. Soc. (Zool.) v. 1889, p. 105; Bedr. Bull. Soc. Nat. Mosc. 1889, p. 387; Héron-Royer & Van Bambeke, Arch. Biol. 1889, p. 293, pl. xiii. figs. 5-8; Boettger, Cat. Batr. Mus. Senck. 1890, p. 34; Mariacha, Riv. Ital. Sci. Nat. ix. 1889, p. 29; Blgr. Fauna Brit. Ind., Rept. & Batr. 1890, p. 504; Trans. Zool. Soc. xiii. 1891, p. 158; Proc. Zool. Soc. 1891, p. 612, pl. xvi. fig. 5; Hart, Fauna & Flora Sinai, 1891, p. 210; Anderson, Proc. Zool. Soc. 1892, p. 23; König, Verh. (S.B.) nat. Ver. Bonn, 1892, p. 25; Werner, Verh. zool.-bot. Ges. Wien, xlii. 1892, p. 355; Camerano, Boll. Mus. Torino, viii. 1893, no. 162, p. 3; Pfeffer, Jahrb. Hamb. Anst. x. 1893, p. 35; Olivier, Mém. Soc. Zool. France, vii. 1894, p. 128; Peracca, Boll. Mus. Zool. Torino, ix. 1894, no. 167, p. 17; Werner, Verh. zool.-bot. Ges. Wien, xliv. 1894, p. 87; Anderson, Herpet. Arabia & Egypt, 1896, pp. 83, 87, & 111; Boettger, Verh. zool.-bot. Ges. Wien, xvi. 1896, p. 279; Blgr. Proc. Zool. Soc. 1896, p. 548; Escherich, Verh. zool.-bot. Ges. Wien, xvi. 1896, p. 277.
- Bufo schreberianus*, Laur. Syn. Rept. 1768, p. 27.
- Rana variabilis*, Pallas, Spicil. Zool. fasc. vii. 1769, p. 1, pl. vi. figs. 3-4; Hermann, Affin. An. 1783, p. 308; Sturm, Deutschl. Fauna, Abtheil. iii. (1798-1828) Heft 2.
- Rana sitibunda*, Pallas, Reise, i. 1771, p. 458; Donndorff, Zool. Beytr. iii. 1798, p. 48.
- Rana bufina*, Müller, Zool. Danica, Prod. 1776, p. 35, no. 293; Retzius, Fauna Suecica, 1800, p. 283.
- Rana (Bufo) viridis*, Donndorff, Zool. Beytr. iii. 1798, p. 41.
- Bufo sitibunda*, Schn. Hist. Amph. i. 1799, p. 225.
- Bufo variabilis*, Merr. Syst. Amph. 1820, p. 180; Risso, Hist. Nat. Europ. mérid. iii. 1826, p. 93; Brandt & Ratzeburg, Med. Zool. i. 1829, p. 197, pl. 23. figs. 2 & 11; Gravenh. Delic. Mus. Zool. Vratislav. 1829, p. 63; Eichwald, Zool. Spec. Ross. et Polon. iii. 1831, p. 167; Tschudi, Mém. Soc. Sc. Nat. de Neuchâtel, ii. 1835, p. 88; Schinz, Nouv. Mém. Soc. Sc. Helv. i. no. 3, 1837, p. 145; Krynicki, Bull. Soc. Nat. Mosc. 1837, no. 3, p. 67; Gervais, Ann. Sc. Nat. (3) x. 1848, p. 205; Jan, Filippi, Viagg. in Persia, 1865, p. 357; Bedr. Bull. Soc. Imp. Mosc. 1879, no. 3, p. 24; Schreiber, Herp. Europæa, 1875, p. 138; Boettger, Ber. Senck. Ges. 1880, p. 211; Reichenow, Sitzb. Ges. naturf. Fr. Berl. 1883, p. 150; Del Prato, Atti Soc. Ital. Sc. Nat. xxxv. 1895, p. 205.
- Bufo arabicus*, Heyden, Rüpp. Reise nördl. Afr. 1827, p. 20, pl. v. fig. 2.
- Bufo variabilis*, var. *crucigera*, Eichw. Zool. Spec. Ross. et Polon. iii. 1831, p. 167.
- Bufo calamita*, Gthr. (*non* Laur.), Gthr. Rept. Brit. Ind. 1864, p. 420.
- Bufo pantherinus*, Rüppell, *part.*, Mus. Senck. iii. 1845, p. 315; Dum. & Bibr. *part.*, viii. 1841, p. 687.
- Bufo vulgaris*, *part.*, Gthr. Proc. Zool. Soc. 1878, p. 977.
- Bufo boulengeri*, Lataste, Rev. Int. Sc. 1879, p. 438.



*Bufo mauritanicus*, part., Boettger, Kobelt's Reis. Alger. u. Tunis, 1885, p. 474.

*Bufo viridis*, var. *balearica*, Boettger, Zool. Anz. 1880, p. 642; Cat. Batr. Mus. Senck. 1890, p. 35.

1 ♀. Under a small bridge over a water-conduit, Ramleh, Alexandria.

Snout short and moderately broad; nostrils close to the extremity of the snout, distant from it about one-third of the interval between it and the eye. Interorbital space flat, not so broad as an upper eyelid. Eye twice, or more than twice, the diameter of the tympanum; the latter more or less vertically oval, distinct. Parotoids variable, in some very large, more or less elongate, bean-shaped, generally passing backwards on a line with the vertical of the axilla. Male with a subgular vocal sac. First finger somewhat longer than the second, or the two nearly of equal length; toes about one-half or two-thirds webbed, with small, simple, subarticular tubercles, and two moderately large metatarsal tubercles and a tarsal fold; tarso-metatarsal joint, when the limb is laid forwards, generally reaches the front of the eye; obscure, porous, rounded eminences or warts scattered over the skin. General colour greyish olive, with rather brilliant green spots, and the warts finely punctulated with bright pink (♂), or the upper surface nearly uniform greyish; under surface white, or more or less dusky spotted.

This species, as far as my observations go, does not appear to be common in Lower Egypt, for, although I was very often on the lookout for it, I succeeded in finding only a single specimen.

It is distributed over Northern Africa, from Egypt to Morocco, penetrating the Nile valley to Luxor, and extending as far south as the island of Dahalak in the Red Sea. Its western range in Europe extends to the Rhine and to the Alps up to 6500 feet. It is spread over the rest of Southern Europe, and occurs in the Balearic Islands. In Asia it is present in North-west Arabia, Palestine, Syria, Asia Minor, Persia, Baluchistan, northwards through Afghanistan to Eastern Turkestan, Central Asia, and to the Himalayas, where it has been found at an elevation of 15,000 feet.

In Europe the breeding-season of this toad begins in the first part of April and lasts to the middle of June, and those sexually active remain a long time in the water.

Dr. Innes, to whom I am indebted for the native name, says this toad and *B. regularis* are known as طيني, *dofdah tini*=land-frog.



## BUFO REGULARIS, Reuss. (Plate L. fig. 3.)

*Bufo cinereus* (non Schn.), Licht. Doubl. Berl. Mus. 1823, p. 106, no. 114.

*Grenouille ponctuée*, Is. Geoff. St.-Hil. Descr. de l'Égypte, Hist. Nat. i. ? 1827, p. 160, footnote, pl. iv. figs. 1 & 2.

*Bufo regularis*, Reuss, Mus. Senck. i. 1834, p. 60; Blgr. Proc. Zool. Soc. 1880, p. 560, pl. lii. var. B, ♀; Cat. Batr. Sal. B. M. 1882, p. 298; Peters, Reise n. Mossamb. iii. Amph. 1882, p. 178; Vaillant, Réveil, Faune et Flore Pays-Comalis, 1882, p. 25; Fischer, Jahrb. Hamb. Wissenschaft. Anst. i. 1884, p. 26; Tristram, West. Palest., Rept. & Batr. 1884, p. 160; Vaillant, Bull. Soc. Philom. (7) viii. 1884, p. 171; Müller, Verh. nat. Ges. Basel, vii. 1885, p. 671; Parenti e Picaglia, Rett. ed Anf. Mar Rosso, 1886, p. 71; Bocage, Journ. Sc. Lisb. xi. 1887, p. 192 et p. 208; Günther, Proc. Zool. Soc. 1888, p. 51; Héron-Royer & Van Bambeke, Arch. Biol. 1889, p. 297, pl. xxiv. figs. 7-9; Müller, Verh. nat. Ges. Basel, viii. 1887, p. 258, et 1889, p. 689; Boettger, Cat. Batr. Mus. Senck. 1890, p. 35; Günther, Proc. Zool. Soc. 1892, p. 555; Pfeffer, Jahrb. Hamb. Wissen. Anst. x. 1893, p. 35; Stejneger, Proc. U.S. Nat. Mus. xvi. 1893, p. 737; Günther, Proc. Zool. Soc. 1894, p. 88; Bocage, Herpét. d'Angola et du Congo, 1895, p. 185; Blgr. Ann. Mag. N. H. (6) xv. 1895, p. 526; Proc. Zool. Soc. 1895, p. 540; Anderson, Herpet. Arabia & Egypt, 1896, p. 110; Bocage, Journ. Sc. Lisboa, (2) iv. no. 14, 1896, pp. 81, 96, & 114; Blgr. Ann. Mus. Civ. Genova, (2) xvi. (xxxvi.) 1896, p. 554; Proc. Zool. Soc. 1896, p. 217; Mocquard, C. R. Soc. Philom. no. 19, 1896, p. 45; Blgr. Ann. Mus. Civ. Genova, (2) xvii. (xxxvii.) 1896, p. 14, p. 22, et p. 280; Ann. & Mag. N. H. (6) xix. 1897, p. 281; Proc. Zool. Soc. 1897, p. 801; Tornier, Kriechth. Deutsch-Ost-Afr. 1897, p. 160.

*Bufo pantherinus*, Dum. & Bibr., part., viii. 1841, p. 687; Rüppell, part., Senck. iii. 1845, p. 315; Guichenot, Lefèbvre, Voy. Abyss. vi. Zool. 1845-50, pl. iv. fig. 2; Günther, part., Cat. Batr. Sal. B. M. 1858, p. 59; Peters, Mon. Berl. Ak. 1862, p. 279; Blanf. Geol. & Zool. Abyss. 1870, p. 459; Günther, Burton's Gold Mines of Midian, 1878, p. 398; Bedr. Bull. Soc. Nat. Mosc. 1879, no. 3, p. 25; part., Boettger, Ber. Senck. nat. Ges. 1880, p. 211; Lortet, Arch. Mus. Hist. Nat. Lyon, iii. 1883, p. 189.

*Bufo cinereus*, Hallowell, Proc. Ac. Philad. ii. (1844-45) 1846, p. 169.

*Rana mosaica*, Seetzen, Reise Syrien, Paläst., Aegypt. &c. 1855, iii. p. 492.

*Bufo maculatus*, Hallow. Proc. Ac. Philad. vii. (1854-55) 1856, p. 101.

*Bufo guineensis* (non Schlegel), part., Günth. Cat. Batr. Sal. B. M. 1858, p. 59.

*Bufo spinosus*, Bocage, Proc. Zool. Soc. 1867, p. 845.

*Bufo vulgaris*, part., Günther, Proc. Zool. Soc. 1878, p. 977.

*Bufo regularis*, var. *spinosa*, Boettger, Ber. Senck. Ges. 1887-88, p. 100; Kat. Batr. Mus. Senck. 1890, p. 35.

2. Ramleh.

1. Beltim. Surgeon Lieutenant-Colonel Sir J. G. Rogers, D.S.O., K.C.M.G.

3. Mahallet el Kibir. George Kent, Esq.

12. Freshwater Canal, Suez.
4. Backwaters of the Nile below Mena.
8. The Fayum. Major R. H. Brown, R.E., C.M.G.
7. Tel el Amarna. Professor W. M. Flinders Petrie, D.C.L.
8. Assuan.
2. Wádí Halfa.
1. Wádí Halfa. Surgeon-Captain R. H. Penton, D.S.O.

Snout short and broad; nostrils halfway between the eye and the extremity of the snout; interorbital space flat or slightly concave from side to side, equalling the breadth of the upper eyelid; tympanum about the size of the eye or somewhat smaller, vertically oval, very prominent. Parotoid large, elongate, extending backwards to the vertical of the shoulder or even to that of the axilla. Males with a subgular vocal sac. First finger generally decidedly longer than the second; toes one-third webbed, with small, simple, subarticular tubercles; two well-developed metatarsal tubercles and a tarsal fold; under surface of the toes and metatarsus with small horny capped tubercles. Tarso-metatarsal joint, when the limb is laid forwards, reaches the anterior border of the tympanum or to the eye. Skin covered with large and small warts capped with horny points.

General colour olive-brown or olive-grey, with numerous more or less regular or irregular brown markings, and occasionally whitish spots; upper lip usually barred with brown; a brown bar below each nostril and generally three behind it; a white vertebral line sometimes present; underparts white, as a rule immaculate, occasionally with large dusky spots.

♂. Snout to vent 91 millim.; hind limb 106; long axis of eye 8; vertical diameter of tympanum 7.9.

This species is very plentifully distributed over the valley of the Nile from the sea southwards. It is common at Suez in the Freshwater Canal and extends into North-western Arabia, and has been found by the late Sir Richard Burton in Midian. It is also spread over the greater part of the continent south of the Sahara, as it ranges from Somaliland and Abyssinia to Senegambia, and occurs at the Cape of Good Hope.

The shape of the head varies considerably and also the breadth of the snout. The coloration is sometimes very pale, depending seemingly on the nature of the surroundings of the toad; *e. g.*, a breeding male from the sandy region of Ramleh was entirely pale greyish olive.

It is closely allied to the Algerian toad, *B. mauritanicus*, but differs from it in having a larger tympanum, and by its toes being somewhat more webbed, with simple instead of double subarticular tubercles.

At Kahûn, where the remains of a whole provincial town of the 12th Dynasty have

been laid bare, Prof. Flinders Petrie, amongst a multiplicity of objects, found an earthenware figure in blue glaze, evidently intended to represent this toad, and I am indebted to him for permission to figure it (fig. 13, p. 356).

BUFO PENTONI, Anderson. (Plate L. fig. 4.)

*Bufo pentoni*, Anderson, Ann. & Mag. N. H. (6) xii. 1893, p. 440; Proc. Zool. Soc. 1895, p. 662; Herpet. Arabia & Egypt, 1896, p. 111.

2 ♂ and 1 ♀. Shaata Gardens, Suakin. Surgeon-Captain R. H. Penton, D.S.O.  
17 ♀, 1 ♂, and 1 juv. Shaata Gardens, Suakin.

Snout very short and broad; nostrils close to the end of the snout; interorbital space flat or slightly concave from side to side, equalling the breadth of the upper eyelid; tympanum about half the size of the eye, more or less vertically oval, well defined; parotoid large, oval, extending to or behind the vertical of the axilla. Males with a subgular vocal sac. First finger generally decidedly longer than the second; toes two-thirds webbed, with small, simple, subtubercular tubercles; two large, prominent, horny metatarsal tubercles and a conical well-developed tubercle close to the tarso-metatarsal joint; a feeble tarsal fold; under surface of toes and metatarsus nearly devoid of tubercles; tarso-metatarsal joint when the limb is laid forwards reaches the tympanum. Skin covered with moderately-sized, somewhat flattened warts, each capped with a horny point varying greatly in its development and not unfrequently absent.

General colour olive, tinged with yellowish, with obscure dark markings on the back and one across the upper eyelids; the warty eminences behind the ear and on the sides of body bright yellow or reddish, the chin and lower lip rather bright yellow with an orange tinge. Under surface and the inner halves of the upper surfaces of the hands and feet milky white, the sternal region tinged with orange.

♂. Snout to vent 70 mm., hind limb 75 mm.

♀.       "       75       "       82       "

This species occurs abundantly around Suakin, especially in the Shaata Gardens, about one mile outside the town. In these gardens there are numerous, wide, deep wells lined with brickwork, and in them this toad is generally to be found. As they have to support themselves above water by clinging on to the brickwork their digits become ulcerated and the sores are attacked by some organism, the presence of which in some cases produces complete destruction of the digits. The toads fall into these wells, and in the majority of cases are unable to escape. In the open country diseased digits are not met with.

It is a burrowing species, and in adults the skin on the front of the snout is more or

less indurated and horny in appearance; but it also takes advantage of the holes made by mammals and reptiles.

As yet it has not been recorded from any other district on the western side of the Red Sea, besides Suakin, but it is present on the opposite coast, in the neighbourhood of Aden.

Fig. 13.



A toad in blue glazed earthenware. (? *Bufo regularis*.)  
Ruins of Kāhūn, a 12th Dynasty provincial town (Professor W. M. Flinders Petrie).

## HYLIDÆ.

## HYLA.

*Hyla*, Laurenti, Syn. Rept. 1768, p. 32, *part.*; Blgr. Cat. Batr. Sal. B. M. 1882, p. 337; Fauna of Brit. Ind., Rept. & Batr. 1890, p. 509.

“Pupil horizontal. Tongue entire or slightly nicked, adherent or more or less free behind. Vomerine teeth. Tympanum distinct or hidden. Fingers free or more or less webbed; toes webbed, the tips dilated into smaller or larger disks. Outer metatarsals united or slightly separated. Omosternum cartilaginous; sternum a cartilaginous plate. Diapophyses of sacral vertebra more or less dilated.”—*Blgr.*

## HYLA ARBOREA, Linn.

*Rana arborea*, Linn. Syst. Nat. i. 1766, p. 357.

## Var. SAVIGNYI, Blgr.

*Hyla savignyi*, Aud. Descr. de l'Égypte, Hist. Nat. i. ? 1829, p. 183, Suppl. Rept. pl. ii. (1812) figs. 131 & 132.

*Rana arborea*, Seetzen, Reise Syrien, Paläst., Aegypt. &c. iii. 1855, p. 486.

*Hyla arborea*, Anderson, Proc. Zool. Soc. 1872, p. 403; Herpet. Arabia & Egypt, 1896, p. 114.

*Hyla arborea*, var. *meridionalis*, *part.*, Boettger, Ber. Senck. nat. Ges. 1879–80, p. 212.

*Hyla arborea*, var. *savignyi*, Blgr. Cat. Batr. Sal. B. M. 1882, p. 380; Camerano, Boll. Mus. Torino, viii. 1893, no. 162, p. 4.

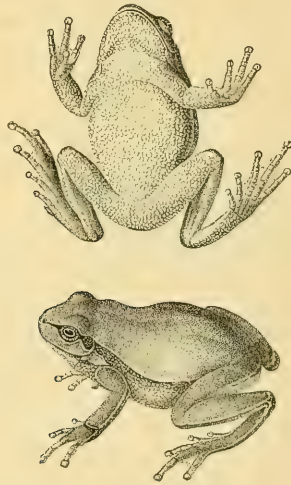
This variety of the common tree-frog of Europe, described by Audouin, is characterized by him as follows:—This species much resembles in its general form, in the apple-green colour of the whole of the upper surface of the body, and in the granular structure of the integument of the abdomen and under surface of the limbs, the common tree-frog, but differs from it in the disposition of the yellowish bands that one observes on its sides. As in the green tree-frog, a black line extends from the nostril to the eye, passes over the tympanum, and is prolonged more or less on to the flanks; two other yellowish lines start, likewise, from the posterior angle of the eye; the lower of the two, instead of running along the inferior border of the black line of the flanks, passes a little downwards and borders the posterior aspect of the anterior limb to its extremity; the upper of the two yellow bands runs along the upper surface of the black line, but forms no sinuous angle upon the loins, but extends along the whole length of the external border of the hind limb. The under surface of the body is yellowish white.

Mr. Boulenger gives the following as the distinctive characters of this variety:—



"Similar to the typical form, but the marking on the loin is absent; the lateral streak frequently broken up into spots from the middle of the side." This description is based on individuals from the island of Elba, from the region to the east of the Levant as far as Resht in Northern Persia, and from the island of Hainan in the Chinese Sea. The description given by Audouin of *Hyla savignyi* differs but little from the characters usually found in the typical form, with the single exception that the marking on the loins is absent. No Egyptian example of this frog exists in any museum, so far as I am aware; and as Audouin's description is the only one extant, the figure on which his account was based is here reproduced (fig. 14), as there is no evidence that he had a specimen before him when he wrote it.

Fig. 14.



Reproduction of figure of *Hyla savignyi*, Aud.  
(Descr. de l'Égypte, Hist. Nat. Suppl., Reptiles, pl. ii. (1812) figs. 131 & 132.)

I took a great deal of trouble, while in Lower Egypt, to try and discover this frog, but without success. I had a coloured drawing of it prepared and had it showed to many native gardeners in and around Alexandria, but not one of them recognized it.

This variety is common in Palestine and Syria, and also to the west of Egypt, along the coast-line of the Mediterranean. It has also an extensive distribution over Asia, and occurs as far east as Japan.

## BATRACHIA CAUDATA.

## SALAMANDRIDÆ.

Gervais<sup>1</sup> has recorded that A. Lefèvre or Lefèbvre, who is not to be confounded with Théophile Lefèbvre of Abyssinian fame, obtained a species of triton in the oasis of "Barieh," or more correctly Baharieh.

Mr. Boulenger, writing in 1882<sup>2</sup>, mentioned that M. F. Lataste had received several larvæ of a Salamandroid collected near Alexandria by M. Letourneux.

These are the only two references in zoological literature that mention the presence in Egypt of this group of Batrachians.

I made a most careful search during two successive years for Salamandroids in the neighbourhood of Ramleh, and on two or three occasions I employed an intelligent Syrian, who used to collect for M. Letourneux, to do the same, but neither I nor he ever succeeded in finding any. I went provided with some British newts in alcohol to show to the natives, in order to give them some idea of the kind of animal of which I was in quest; but all the agricultural labourers, in the localities I had selected as appearing to me to be the most likely spots in which to find Salamandroids, declared that they had never seen such animals. This experience, however, should not deter others from continuing the search, in view of what has been put on record by the foregoing authorities.

<sup>1</sup> Ann. Sc. Nat. (sér. 2) vi. 1836, p. 312.

<sup>2</sup> Cat. Batr. Grad. 1882, p. 106.

TABLE ILLUSTRATING  
THE  
DISTRIBUTION OF THE SPECIES  
OVER THE AREAS DEALT WITH IN THIS WORK.

Explanation of the letters of the alphabet heading the columns :—A. Littoral at Marsa Matru; B. Littoral of Delta; C. Delta south to Beni Suef; D. Beni Suef to Assuan; E. Assuan to Wádí Halfa; F. Wádí Halfa to Khartum; G. Sennaar; H. Kordofan; I. Valley of White Nile; J. Nubia and Sudan, when no more detailed information has been available; K. Arabian desert, Ismailia and Suez to Kosseir; L. Durrur to Akik; M. Oasis of Siwah; N. Oasis of Dakhel; O. Oases of Khargeh and Berys.

Species in italics have not yet been recorded from the Nile Valley to the north of Wádí Halfa.

	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.	K.	L.	M.	N.	O.
REPTILIA.															
<i>Crocodilus niloticus</i> , <i>Laur.</i> . . . . .					*	*	*		*	*					
<i>Testudo</i> <sup>1</sup> <i>calcarata</i> , <i>Schn.</i> . . . . .						*	*	*							
" <i>leithii</i> , <i>Gthr.</i> . . . . .			*												
<i>Sternotherus adansonii</i> ( <i>Schweigg.</i> ) . . . . .						*			*						
<i>Pelomedusa galeata</i> ( <i>Schoepff</i> ) <sup>2</sup> . . . . .						*			*						
<i>Trionyx triunguis</i> ( <i>Forstål</i> ) <sup>3</sup> . . . . .			*	*	*	*	*		*	*	*				
<i>Cyclanorbis senegalensis</i> ( <i>D. &amp; B.</i> ) . . . . .						*	*		*	*	*				
<i>Stenodactylus elegans</i> ( <i>Fitz.</i> ) . . . . .			*	*	*	*	*		*	*	*	*			
" <i>petrii</i> , <i>Anders.</i> . . . . .					*										
<i>Tropicolotes tripolitanus</i> , <i>Peters</i> . . . . .			*	*											
" <i>steudneri</i> ( <i>Peters</i> ) . . . . .			*	*	*	*	*								
<i>Bunopus blanfordii</i> , <i>Strauch</i> . . . . .				?	?		*								
<i>Gymnodactylus scaber</i> ( <i>Heyden</i> ) . . . . .			*	*	*	*	*		*	*	*	*			
<i>Pristurus flavipunctatus</i> , <i>Rüppell</i> . . . . .			*	*	*	*	*		*	*	*	*	*		
<i>Ptyodactylus hasselquistii</i> ( <i>Donndorff</i> ) . . . . .			*	*	*	*	*		*	*	*	*	*		
<i>Hemidactylus flaviviridis</i> , <i>Rüppell</i> . . . . .			*	*	*	*	*		*	*	*	*	*		
" <i>turcicus</i> ( <i>Linn.</i> ) <sup>4</sup> . . . . .			*	*	*	*	*		*	*	*	*	*		
" <i>turcicus</i> , var. <i>sinaita</i> , <i>Blgr.</i> . . . . .			*	*	*	*	*		*	*	*	*	*		
<i>Tarentola mauritanica</i> ( <i>Linn.</i> ) . . . . .	*	*	*						*	*	*	*	*		
" <i>ephippiata</i> , <i>O'Shaughn.</i> . . . . .			*	*	*	*	*		*	*	*	*	*		
" <i>annularis</i> ( <i>Is. Geoffr. St.-Hil.</i> ) . . . . .			*	*	*	*	*		*	*	*	*	*		
<i>Agama mutabilis</i> , <i>Merr.</i> . . . . .			*	*	*	*	*		*	*	*	*	*		
" <i>pallida</i> , <i>Reuss</i> . . . . .			*	*	*	*	*		*	*	*	*	*		

<sup>1</sup> *Testudo ibera*, Pallas, has been stated on native report to be present in the Sudan, but this is doubtful.

<sup>2</sup> Present in Sinaitic Peninsula.

<sup>3</sup> Present in Natron Lakes.

<sup>4</sup> Present in the island of Shadwan.

	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.	K.	L.	M.	N.	O.
REPTILIA (cont <sup>d</sup> ).															
<i>Agama sinaita</i> , Heyden <sup>1</sup> .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>flavimaculata</i> , Rüppell .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>spinosa</i> , Gray .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>colonomum</i> , Daud. ....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>hartmanni</i> , Peters .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>stellio</i> (Linn.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Uromastix ocellatus</i> , Licht. ....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
? „ <i>ornatus</i> , Heyden .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>egyptius</i> (Hasselq. & Linn.) ..		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>acanthimurus</i> , Bell .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Varanus griseus</i> (Daud.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>ocellatus</i> , Heyden .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>niloticus</i> (Hasselq. & Linn.) ..		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Latastia longicaudata</i> (Reuss) ..		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Acanthodactylus boskianus</i> (Daud.)		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>pardalis</i> (Licht.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>scutellatus</i> (Aud.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Eremias mucronata</i> (Blanf.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>guttulata</i> (Licht.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>rubropunctata</i> (Licht.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Gerrhosaurus flavigularis</i> , Wieg. ....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Mabuia quinquetæniata</i> (Licht.) ..		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>vittata</i> (Olivier) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Eumeces schneideri</i> (Daud.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Scincopus fuscatus</i> , Peters .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Scincus officinalis</i> , Laur. <sup>2</sup> .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Chalcides ocellatus</i> (Forskål) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>sepoides</i> (Aud.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>delislii</i> (Lataste) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Chamaeleon vulgaris</i> (Linn.) <sup>3</sup> ..		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>calyptratus</i> , A. Dum. ....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>basiliscus</i> , Cope <sup>4</sup> .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Glauconia cairi</i> (D. & B.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>macrorhynchus</i> (Peters) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Python sebae</i> (Gmelin) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Eryx thebaicus</i> , Reuss .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>jaculus</i> (Hasselq. & Linn.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>muelleri</i> , Blgr. ....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Tropidonotus tessellatus</i> (Laur.) ..		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Zamenis gemonensis</i> (Laur.), var. <i>asiana</i> .		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>dahlia</i> (Fitz.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>rhodorrhachis</i> , Jan .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>rogersi</i> , Anders. ....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>florulentus</i> (Is. Geoffr. St.-Hil.) ..		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>ravergieri</i> (Ménétr.), var. <i>nummifer</i> , Reuss .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
„ <i>diadema</i> (Schl.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Lytorhynchus diadema</i> (D. & B.) ..		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Coluber situla</i> , Linn. ....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Oligodon melanocephalus</i> (Müller) ..		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Dasypeltis scabra</i> (Linn.) .....		*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Tarbophis savignyi</i> , Blgr. ....		*	*	*	*	*	*	*	*	*	*	*	*	*	*

<sup>1</sup> The presence of this species in the oases of Khargeh and Berys seems doubtful.<sup>2</sup> Present in oasis of Baharieh.<sup>3</sup> Said to be present in W. Natrun.<sup>4</sup> Probably introduced into the Delta by human agency.

	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.	K.	L.	M.	N.	O.
REPTILIA (cont <sup>d</sup> ).															
<i>Tarbophis obtusus</i> (Reuss) .....	..	*	*	*	..	..	*								
<i>Leptodira hotambæia</i> (Laur.) .....	..	..	..	..	..	..	*								
<i>Cacelopeltis moilensis</i> (Reuss) .....	..	..	*	*	..	..	*	..	..	..	..	*			
" <i>monspessulana</i> (Hermann) <sup>1</sup> ..	..	*	..	..	..	..	..	..	..	..	..	*			
<i>Psammophis schokari</i> (Forskål) .....	..	..	*	*	..	..	*	..	..	..	..	*	*	..	*
" <i>sibilans</i> (Linn.) .....	..	*	*	*											
<i>Macroprotodon cucullatus</i> (Is. Geoffr. St.-Hil.) .....	..	*													
<i>Naja haje</i> (Hasselg. & Linn.) .....	..	*	*	*	*	*	*	..	..	*					
" <i>nigricollis</i> , Reinh. ....	..	..	..	..	*										
<i>Walterinnesia ægyptia</i> , Lat. ....	..	..	..	..	..	?	?	..	?	?					
<i>Causus resimus</i> (Peters) .....	..	..	..	..	..	..	*								
<i>Bitis arietans</i> (Merr.) .....	..	..	..	..	..	*	*	*	*						
<i>Cerastes cornutus</i> (Hasselg. & Linn.) ..	..	*	*	*	*	*	*	..	..	..	*	*			
" <i>vipera</i> (Hasselg. & Linn.) ..	..	*	*	*	..	..	..	..	..	..	*	..	*		
<i>Echis carinatus</i> (Schn.) .....	..	*	*	*	..	*	..	..	..	..	..	*	*		
BATRACHIA.															
<i>Rana cordofana</i> , Steindach. ....	..	..	..	..	..	..	..	*							
" <i>esculenta</i> , Linn. ....	..	*													
" <i>mascareniensis</i> , D. & B. ....	..	*	*	*	*	*	*	..	..	*					
<i>Cassina senegalensis</i> (D. & B.) .....	..	..	..	..	..	..	*								
<i>Hemisus sudanense</i> (Steindach.) .....	..	..	..	..	..	..	..	*	..	*					
<i>Bufo viridis</i> , Laur. ....	..	*	..	..	..	..	..	..	..	..	..	..	..	*	
" <i>pentoni</i> , Auders. ....	..	..	..	..	..	..	..	..	..	..	..	*			
" <i>regularis</i> , Reuss .....	..	*	*	*	*	..	..	..	..	..	*				
<i>Hyla arborea</i> (Linn.), var. <i>savignyi</i> , Blgr. ..	..	?													
<i>Salamandra</i> , sp. ignotæ <sup>2</sup> .....	..	?													

<sup>1</sup> This species has been recorded by Rohlf from the Regenfeld, in the west of the Libyan desert.<sup>2</sup> The larva of a species has been obtained in the oasis of Bahariel.



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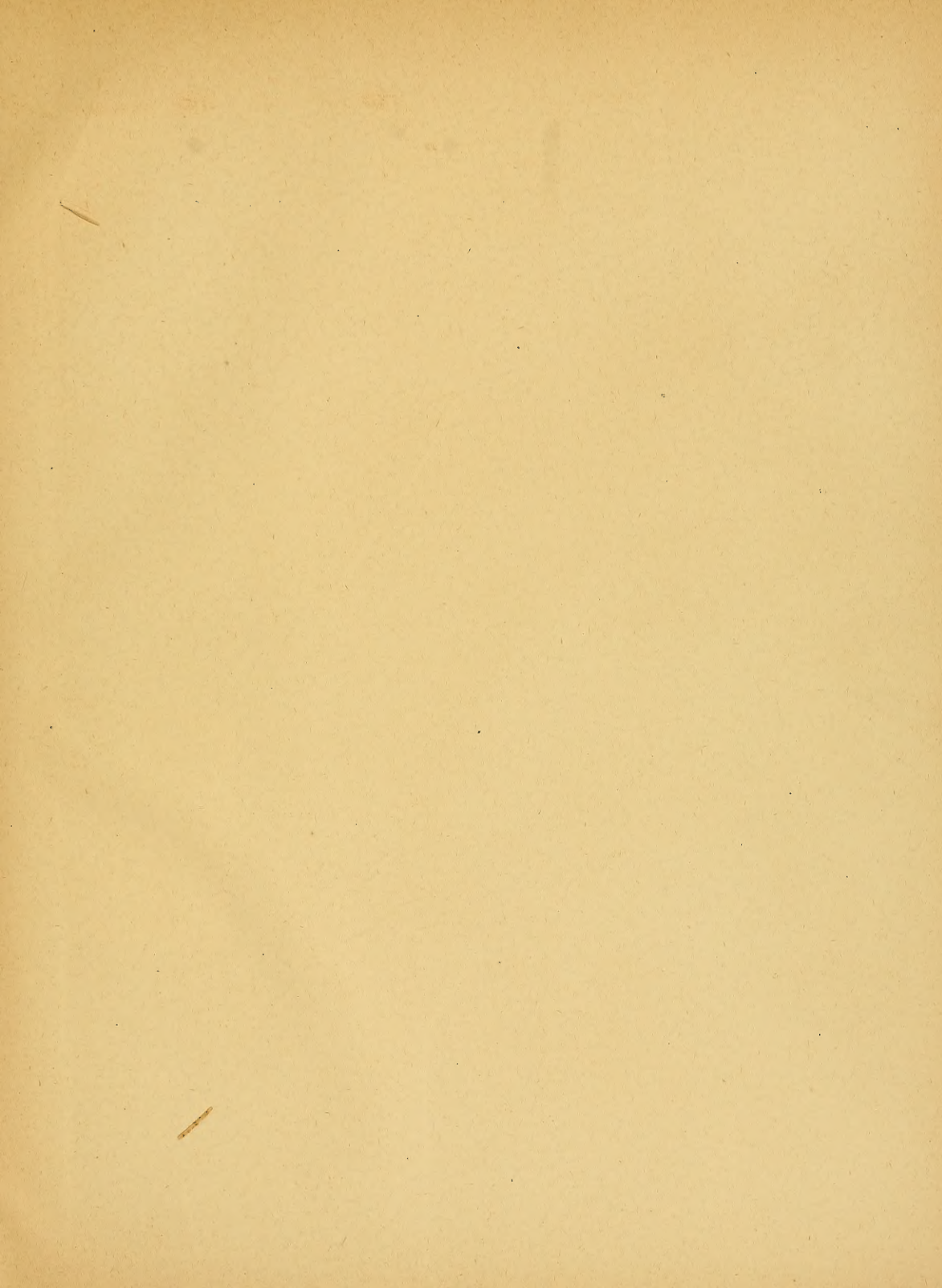
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